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POUILLAUDE (I.). Quelques Tysanoptères nuisibles. [Some injurious Thysanoptera.] — *Insecta, Rennes*, April 1913, pp. 139-145, 5 figs.

This paper is a résumé of the habits and occurrence of the more important injurious Thrips. The author says that they are, in practice, very resistant to the action of insecticides in consequence of their great numbers, but that in enclosed spaces, such as greenhouses, it is not difficult to get rid of them. He recommends tobacco fumigation, the use of nicotine in solution, and hydrocyanic acid fumigation. In the open, a  $1\frac{1}{2}$  per cent. solution of nicotine, with  $1\frac{1}{4}$  per cent. of soft soap, is recommended, or a similar strength of soft soap with  $2\frac{1}{2}$  per cent. of flowers of sulphur in place of the nicotine. Spraying with these mixtures should be done preferably in the evening or in the early morning and is useful for shrubs and kitchen garden plants. In the case of field crops, all that can be done is to destroy all rubbish and waste material around them and to change the crops frequently; in the case of cereals the sowing of early-ripening varieties of grain is recommended, so that when the thrips arrive they may not have the opportunity of doing so much damage. The article concludes with a brief bibliography.

HOLMAN-HUNT (C. B.). Notes on Insect Pests in the Federated Malay States.—*Agric. Bull. Fed. Malay States*, i, April 1913, pp. 327-328.

The locust, *Pachytylus danicus*, has been reported from many places in Selangor, Negri Sembilan and Malacca. A Hispid beetle recently reported as attacking coconuts near Singapore has now been found on young plants from Kuala Selangor and a Lepidopteron, *Hidari irava*, has also done considerable damage, but the larvae are parasitised to a very large extent by an Ichneumon. A large white cockchafer or May-beetle, allied to *Tricholepis lactea*, has been reported from Kedah as doing damage in the grub stage to roots of rubber seedlings. This grub usually feeds on roots of grasses and probably some of these have been left in the soil and the rubber roots only attacked by accident.

MASKEW (F.). Sweet Potato Weevil (*Cylas formicarius*).—*Mthly. Bull. State Comm. Hort., Sacramento, California*, ii, pt. 5, May 1913, pp. 535-537, 2 figs.

This pest was found by the Inspectors at San Francisco in a shipment of sweet potatoes from China, and the author has no doubt that this is by no means the first time that it has arrived in the United States. Superficially there is very little to show that the potato has been attacked, beyond the minute hole through which the larva has entered, and the full extent of the ravages can only be seen when the potato is cut open. *Cylas formicarius* is a very widely distributed species and probably a native of Cochin,

China. It has also been reported from the Southern United States, Hawaii, West Indies, Northern Australia, India, and Madagascar [and many localities in Africa], but so far not from the sweet potato fields or markets of California. The author quotes Van Dine's description and says that he has no suggestion to offer as to methods of controlling its ravages in the fields or in the store-room, the special function of his department being to prevent its entry into the country.

**WILSIE (W. E.). The Date Palm Scales and their Control.**—*Mthly. Bull. State Comm. Hort., Sacramento, California*, ii, pt. 5, May 1913, pp. 538-539.

The author says that it is not generally known that with the introduction of the edible date into California, there were also introduced two date scales, *Parlatoria blanchardii* (Targ.) and *Phoenicococcus marlatti* (Ckll.). The amount of damage is still a matter of conjecture, but the longer it is studied the more serious it appears to be. No natural enemies have been found and artificial means of control are the only ones available. In the case of the first-named pest, after the San Francisco fire it was discovered that ornamental palms withstood the great heat and put out new leaves at once after the fire. The burning remedy was then tried on the Tempe garden in Arizona with success, and later many trees were entirely cleaned by this treatment, the method being to defoliate the tree completely to the stump, which is burned over with a gasoline torch. The second pest has been more persistent than the other, for the reason that it works behind and on the base of the leaves out of sight and out of the light. Little is known of its life-history, but it unfortunately attacks the vital parts of the plant, sucking the tender new growth at the base of the leaf. The fruit-stalks, which when young are exceedingly tender and brittle, and when fully grown have to carry the nourishment required for a possible 75 lb. weight of fruit, are sometimes entirely covered by this scale. Various remedies have been tried, many of which resulted in great injury to, or the death of the plant. The first remedy which has given any hope was a special preparation made by a Mr. C. W. Taylor for mealy bug, and this has proved exceedingly successful against both scale-insects. The trees are now treated by spraying during the pollinating season and the solution is sprayed in large quantities on the fruit just forming, without bad results. Young plants have been dipped with success, but care must be taken that no air-bubbles are present on the leaves, for if but a few scales escape the pest very soon spreads and the work must be done over again.

**WATSON (J. R.). Melon Worm and Pickle Worm.**—*Univ. Florida Agric. Expt. Sta., Press Bull. no. 209*, 3rd May 1913, 2 pp.

These insects are reported to have done much damage in Florida in the last season and to be again active. In spite of their common names, either or both of them may be found on cucumbers



or cantaloupes, as well as on gourds and squashes. They seldom attack water-melons. Their habits differ somewhat, as do the remedies to be applied. The pickle worm is the more common. It never eats leaves, but bores into buds, blossoms, stems, and leaf-stalks, as well as into the fruits, which it utterly ruins. The melon worm confines itself more or less to the fruits and leaves, and can be reached by arsenical sprays; the author gives the following formulae as useful:—(a) lead arsenate paste 3 lb.; (b) lead arsenate powder  $1\frac{1}{2}$  lb.; or (c) zinc arsenite 1 lb.; each to be mixed with 50 gals of water; (d) Paris green  $\frac{1}{2}$  lb., fresh slaked lime 1 lb., and water 50 gals. The last is said not to stick so well as the others and to be more liable to burn the foliage. The pickle worm can only be dealt with by the careful collection and destruction of all wormy fruit. The moth will lay eggs sufficient to produce about 300 larvae, so that the destruction of infested material is very important. The author says that the easiest and most successful remedy for both worms is a trap crop, and for this purpose advises that on every acre of cucumbers or cantaloupes 4 to 8 rows of early summer or crook-necked squash should be planted. The moths prefer these to either cucumbers or melons and most of the eggs will be laid on the squash. It is well to make several plantings of the latter so as to have a succession of attractive blossoms and fruits to invite the moths. The first should be planted with the cucumbers or melons and the others at intervals of a week. The infested blossoms and fruit should be diligently picked off and destroyed, and even a simpler way is to pull up and burn each lot of trap plants as soon as they have become thoroughly infested, and before the worms have attained their full size. Cucumbers and melons should not be planted on the same land two years in succession. The pickle worm (*Diaphania nitidalis*) is a whitish caterpillar with conspicuous black dots on each segment; when nearly full grown the worm becomes of a coppery colour. The melon worm (*Diaphania hyalinata*) has no dots but has longitudinal stripes and never becomes copper-coloured. The growth is completed in about 2 weeks. A cocoon is formed in a dry leaf on or near the plant and about a week afterwards the moth issues. The pickle worm moth lays its eggs mostly on the buds and on the flowers, whilst the melon worm moth deposits them chiefly on the tender young leaves, the eggs of both hatching in about 3 or 4 days.

SCELSI (S.). **Spraying for *Chrysomphalus dictyospermi*.**—*Rivista di Agricoltura, Parma*, xix, no. 22, 30th May 1913, p. 349.

The author says that this Coccid can be effectually kept down by spraying orange and other trees with either of the following mixtures:—(a) sulphur  $5\frac{1}{2}$  lb., quicklime 9 lb., water 22 gallons; (b) sulphur  $6\frac{1}{2}$  lb., quicklime  $6\frac{1}{2}$  lb., water 22 gallons. The lime is to be put into a vessel and 2 to 3 gallons of boiling water poured slowly on to it, then the sulphur is added and then 3 more gallons of boiling water. The mixture is violently stirred

for several minutes and then the remainder of the water added with constant stirring. These mixtures should be used frequently, and also during the winter. One spraying in winter and two or three more during the course of growth will free the trees not only from Coccids, but also from other parasites.

MOREAU & VINET. Sur les effets comparés de l'arsenic et du plomb dans les traitements appliqués contre les larves de *Cochylis*. [On the relative effects of arsenic and of lead upon the larvae of *Cochylis*.]—*C. R. Acad. Sci., Paris*, clvi, no. 11, 17th March 1913, pp. 906-908.

The authors have determined that the larvae of *Cochylis* (*Clysia ambigua*) which escape direct poisoning by arsenate of lead are small, badly developed, and of feeble destructive power, whereas those which escape or resist other methods of treatment are not affected in this way. Experiments were made to determine whether this enfeeblement of the larva was due to the arsenic or to the lead. For this purpose they used arsenate of zinc or of lime and acetate or carbonate of lead. The result showed that the enfeeblement was due to the arsenic. Considering however that the combination of the arsenic with other metals might be of importance, further experiments were made with arsenates of copper and of iron. The first-named acted in much the same way as arsenate of lead, but the insecticidal action of the latter was very feeble. The authors therefore conclude that sprays with a basis of arsenate of lead are the best of the arsenical mixtures.

VAN DER LAAT (J. E.). La apicultura en los jardines escolares. [Bee-keeping in school-gardens.]—*Boletín de Fomento, San José, Costa Rica*, iii, no. 1, 1913, pp. 44-50, 5 figs.

Apiculture has been greatly neglected in Costa Rica, and this paper makes a strong plea for its establishment in the school curriculum, not merely on account of its educational value, but because of its economic importance in increasing the yield of coffee, cacao, and fruit plantations, apart from the profits from honey and wax.

El cultivo del ajo. [The cultivation of garlic.]—*Boletín de Fomento, San José, Costa Rica*, iii, no. 2, 1913, pp. 130-133.

As in most countries inhabited by Latin races garlic (*Allium sativum*) is cultivated fairly extensively in Costa Rica. Among its enemies are the "white worm" (el gusano blanco) and some Curculionids (pulgones) which may be destroyed effectively by making holes in the soil with a pointed stick, and applying carbon bi-sulphide or vaporite.



KRAUSSE (A.). Über die Beschädigung der Korkeiche durch *Cremastogaster scutellaris*, Ol. [*Cremastogaster scutellaris* damaging the cork-oak.]-*Archiv für Naturgeschichte*, lxxix, A., no. 1, 1913, pp. 56-58, 2 pl.

Almost all the cork-oaks in the district of Sorgono, Sardinia, were found to be severely damaged by the red-headed ant, *Cremastogaster scutellaris*. Fortunately, however, the latter prefers the first layer of cork, of a very inferior quality, and does not damage the tree physiologically. The burrows, which differ from those made by a local species of *Camponotus*, are shown in two excellent photographs.

PICARD (F.). Sur la biologie du *Cacoecia costana* et de son parasite *Nemorilla varia*. [On the biology of *Cacoecia costana* and its parasite *Nemorilla varia*.]-*C.R. Assoc. Française pour l'Avancement des Sciences*, 41st session (Nîmes 1912), Paris, 1913, pp. 429-433.

Considerable damage to vineyards by *Cacoecia costana* has been recorded from the Gironde, the Camargue, and the Pfalz. The life-history of this Tortricid resembles that of *Oenophthira pilleriana*. It destroys young grapes, rolls up the leaves, and spins together the young shoots. In its earlier appearance and in the occurrence of two generations it differs characteristically from *Oenophthira*. *C. costana* is limited to moist or swampy regions, the larvae feeding on *Arundo*, *Epilobium*, *Iris*, &c. Moisture is an absolute necessity for this pest, as is proved by the sudden migration to swampy regions when its usual habitat is dried up during an abnormally hot season. The caterpillars reared by the author were heavily parasitised by the Tachinid fly, *Nemorilla varia*, which lays its eggs on the dorsal part of the integument of its host. The eggs are hatched towards the end of April and the larvae bore their way obliquely through the integument. Larval life only lasts for a week, but the adult fly emerges from the pupa and not from the caterpillar. The parasite always oviposits on the older caterpillars, so that the new generation is obliged to seek other hosts, caterpillars of Microlepidoptera or Geometridae. In this polyphagous habit *Nemorilla* somewhat resembles *Pimpla*.

Plants Attacked by *Diaspis Pentagona*.—*La Rivista di Agricoltura, Parma*, 6th June 1913, p. 360-361.

The following list of plants recognised as food-plants of this pest is published officially by the Italian Ministry of Agriculture:—

*Celtis australis*, L.  
*Betula alba*, L.  
*Caesalpinia japonica*, L.  
*Bignonia catalpa*, L.  
*Ceanothus americanus*, L.  
*Chamaerops excelsa*, Thun.

*Phaseolus vulgaris*, Savi.  
*Fraxinus excelsior*, L.  
*Euonymus europaeus*, L.  
*Broussonetia papyrifera*, Wetr.  
*Gymnocladus dioica*, L.  
*Gleditschia ferax*, Desf.

*Aesculus hippocastanum*, L.  
*Prunus laurocerasus*, L.  
*Amygdalus communis*, L.  
*Paliurus australis*, Gaert.  
*Olearia hastii*, Hook.  
*Urtica dioica*, L.  
*Pelargonium* spp.  
*Populus pyramidalis*, Salisb.  
*Prunus capuli*, Cav.  
*Pueraria thunbergiana*, Benth.  
*Ribes rubrum*, L.  
*Scrofularia canina*, L.  
*Salix* spp.  
*Choisya ternata*, H. B. & K.  
*Syringa vulgaris*, L.  
*Sophora japonica*, L.  
*Spiraea japonica*, L.  
*Trachelospermum jasminoides*.  
*Ribes uva-crispa*, L.  
*Ampelopsis quinquefolia*, Mich.  
*Vitis vinifera*, L.  
*Cucurbita* spp.

*Berberis stenophylla*, Han.  
*Berberis aquifolium*, Pursch.  
*Buddleia lindleyana*, Fort.  
*Caryopteris mastacanthus*,  
     Schacc.  
*Cornus alba*, L'Her.  
*Solanum dulcamara*, L.  
*Sterculia platanifolia*, L.  
*Fuchsia* spp.  
*Morus* spp.  
*Jasminum officinale*, L.  
*Genista scoparia*, Lamk.  
*G. triacanthos*, L.  
*Kerria japonica*, D.C.  
*Humulus lupulus*, L.  
*Juglans regia*, L.  
*Ulmus campestris*, L.  
*Paulownia imperialis*, L.  
*Phyllirea vilmoriana* and  
     *decora*, Boiss. & Bal.  
*Salvia officinalis*, L.  
*S. fortunei*, Planch.

KIRKALDY (G. W.) & MUIR (F.). On some New Species of Leaf-hoppers.—*Rep. Exper. Stat., Hawaiian Sugar Planters' Assoc., Honolulu*, Entom. ser., Bull. no. 12, Jan. 1913, 90 pp., 3 figs.

The first part of this paper, from notes left by the late Mr. Kirkaldy, deals with species of CICADIDÆ collected in the Malay Archipelago by Messrs. Koebele and Muir, the second and larger part with DERBIDÆ from the same region and from Fiji. Many species of the latter family are to be found in large numbers on sugar-cane, but only in the adult stage, where they are conspicuous on account of their sitting near together in Indian file; they do not appear, however, to do any considerable damage. The eggs have not been discovered, but the nymphs were living in rotting tree-trunks. Sixteen new genera and 96 new species are described, but none of the family exist in the Hawaiian Islands, and even if they should become established in cane-fields there, the fact of the young living in rotten timber would confine them to very limited areas.

SCHELLENBERG (H.). Zur Bekämpfung des Heu- und Sauerwurmes. [The control of the Vine-moth, *Clysia (Conchylis) ambiguella*.]—*Schweiz. Zeits. für Obst- und Weinbau, Frauenfeld*, xxii, no. 2, 2nd Jan. 1913, pp. 27-29.

Of all insect pests in Swiss vineyards *Clysia ambiguella* is undoubtedly the most destructive, and appears regularly in those of the Swiss Experiment Station for Horticulture and Viticulture at Wädenswil (Zürich). The caterpillar destroys the inflorescence at haymaking time, hence the name Heuwurm, while the larva



of the second generation (Sauerwurm) feeds on the grape-berries which become sour and impart the sourness to the wine. The hand-picking of the caterpillars from the vines and berries is too costly, and the plants are liable to additional injury by inexperienced hands. The custom pursued at Wädenswil of keeping the vineyards scrupulously clean, especially at the time of pruning, has had a very beneficial effect. Experiments were made with different sprays, Dufour's solution being effective, though not entirely satisfactory. Since 1909 a 3-4 per cent. solution of soft soap, either alone, or in conjunction with Bordeaux mixture, has been used with marked effect. Soft soap solution is to be preferred on account of being more easily prepared and spraying better. A mixture of caustic lime with 1 to 20 per cent. powdered "Cucasa" was also employed, partly with a view to destroying *Peronospora* at the same time, but the results were not satisfactory. In 1910 a 5 per cent. solution of "Plantasalus" was tried, but could not be considered so efficacious as soap, besides having the effect of spotting the leaves. Experiments with quassia infusion showed it to be deadly, but this spray will be submitted to further tests.

SCHNEIDER-ORELLI (O.). Über Schwammspinner und Goldafter. [On *Lymantria dispar* and *Euproctis chrysorrhoea*.]—*Schweiz. Zeits. für Obst- und Weinbau, Frauenfeld*, xxii, no. 2, 22nd Jan. 1913, pp. 18-22, and xxii, no. 3, 8th Feb. 1913, pp. 38-41, 2 figs.

Although the damage done to Swiss orchards by *Cheimatobia brumata* is far greater than that by *Lymantria dispar* and *Euproctis chrysorrhoea*, the latter are sufficiently plentiful to warrant remedial measures. While *Euproctis* is common in low-lying districts throughout Switzerland, *Lymantria* occurs in the Jura (southern and eastern), and in 1891 completely defoliated the beech woods near Ilfingen (Bernese Jura). On account of their hairiness these caterpillars are avoided by most birds, except cuckoos; but tits are useful in destroying the egg-masses. The best way of controlling *Euproctis* is by cutting away any twigs covered with the webs and caterpillars. In the case of *Lymantria* it is possible to protect the fruit-trees by collecting the characteristic egg-masses and by fixing strips of cloth on the trunk to catch the caterpillars which like to hide during the day-time. The paper concludes with an account of the methods employed by the U.S.A. Bureau of Entomology in fighting these pests.

SCHELLENBERG (H.). Zur Bekämpfung der Milben- Kräuselkrankheit. [The control of mite-curl.]—*Schweiz. Zeits. für Obst- und Weinbau, Frauenfeld*, xxii, no. 6, 20th March 1913, pp. 91-92.

At the Swiss Experiment Station for Horticulture and Viticulture crude potassium sulphide and other polysulphides were tested in vineyards against leaf-curl caused by mites. A 3 per

cent. solution of the sulphides was applied with a brush to the buds and it was found that from 150 to 250 vines could be treated in an hour, about 1 lb. of the compounds (which are about 7 per cent. cheaper than potassium sulphide) sufficing for one acre. Where women and children are not available, and vineyards have to be treated on a large scale, application with an atomiser is more economical.

ZSCHOKKE (T.). *Die Meisen in unseren Obstgärten.* [ Tits in our orchards. ]—*Schweiz. Zeits. für Obst- und Weinbau, Frauenfeld*, xxii, no. 11, 7th June 1913, pp. 163-164, 1 fig.

The author comments on the extraordinary efficiency with which the tits freed his orchard from *Cheimatobia brumata*, without damaging any blossoms free from caterpillars. Bullfinches, red-breasts and other birds likewise displayed great activity in detecting and destroying the pests.

Bundesrats beschluss betreffend die Einfuhr frischen amerikanischen und australischen Obstes vom 28 April 1913. [Decree of the Swiss Federal Council of the 28th April 1913 concerning imports of fresh American and Australian fruit.]—*Schweiz. Zeits. für Obst- und Weinbau, Frauenfeld*, xxii, no. 11, 7th June 1913, p. 173.

Every consignment of fresh fruit imported into Switzerland from America or Australia must be examined at the frontier (Basel) by expert inspectors as to the presence of the San José scale or other pests. Consignments containing pests are to be at once destroyed.

BAUDIN (Dr.). *Contre les fourmis.* [A remedy for ants.]—*Moniteur d'Horticulture, Paris*, xxxvii, 25th March 1913, pp. 71-72.

One pound of hydrosulphite of soda (at 1½d. per pound) dissolved in one gallon of water is an excellent spray against ants, which has the additional advantage of cheapness. Where spraying is not feasible, a small quantity in a saucer placed in suitable corners or on shelves is equally effective. Ants may be destroyed in their nests by pouring the solution, boiling if possible, over the latter.

HOLLOWAY (T. E.). *Field Observations on Sugar-Cane Insects in the United States in 1912.*—*U.S. Dept. Agric., Bureau of Entomology*, Circ. no. 171, 21st March 1913, 8 pp.

The peculiar weather during the season of 1912 probably accounts, in part at least, for certain unexpected developments in insect life during the year. In Louisiana a long and cold winter was followed by a wet spring, and vast areas of land were flooded



owing to breaks in the levee of the Mississippi river. There was a slow development of the moth-borer (*Diatraea saccharalis*) and the mealy-bug (*Pseudococcus calceolariae*), which are tropical species and evidently require more warm weather than the native insects. The wet weather retarded the development of the sugar-cane beetle (*Ligyrrus rugiceps*) which, according to some planters, does most damage in dry seasons and on high, sandy soils. The fall army-worm or southern grass-worm (*Laphygma frugiperda*) is more injurious during wet weather and was, therefore, extraordinarily abundant during the summer of 1912. Practically no moth-borers or mealy-bugs were found in the district near Morgan City, La., which had been flooded previous to the author's observations; and this suggests that these insects may possibly be controlled by excessive irrigation. The number of species which were detected injuring cane is surprising; some are apparently of no great importance, though there is a possibility that the sugar-cane weevil borer and the froghopper, which are now rare, may increase in numbers and become formidable pests. The sugar-cane aphid, which is widely distributed, may be capable of doing considerable damage in plantations.

GILL (J. B.). *The Fruit-Tree Leaf-Roller*.—*U.S. Dept. Agric. Bureau of Entomology*, Bull. no. 116, pt. v, pp. 91-110, 12th March 1913, 5 pls., 6 tables.

During the last few years the fruit-tree leaf-roller (*Archips argyrospila*, Walk.), which has been recorded in the U.S.A. from the Atlantic to the Pacific, appeared in enormous numbers in a few localities in Colorado, New Mexico and New York. It is a very general feeder, and has been found on black walnut, horse-chestnut, soft maple, hickory, oak, elm, wild cherry, ash, honey-locust, box-elder, sassafras, hazel-nut, cottonwood, basswood, Carolina poplar, cedar, lilac, roses, Virginia creeper, hops, vine, oats, wheat, alfalfa, red clover, onions, peas, rhubarb, etc., in addition to fruit trees and bushes. The damage is done by the larva feeding on the leaves, rolling them up and spinning webs from leaf to leaf. As soon as the young fruit has set the larva ceases feeding on the foliage, fastens one or more leaves to the fruit and attacks the latter. Damage done to apples and other fruit is usually so severe that the trees cannot outgrow the injury, thus producing a large percentage of unmarketable or second-class fruit. Some excellent photographs are given showing the nature of the damage done.

The larval stage of the leaf-rollers under observation varied from 24 to 35 days, the pupal stage from 9 to 15 days, and the adult or moth stage from 2 to 3 days for the males and 3 to 4 days for the females. Under normal conditions the life of the moths is probably longer. Females were depositing eggs between two and three days after emergence. Under Colorado conditions the egg-laying period extended from about the second week in June to the middle of July, the maximum being reached from 25th June to 10th July. The eggs remain on the trees unhatched until the following spring; there is, in consequence,

only one generation in the course of the year. Generally speaking, the eggs will begin hatching about the time the cluster buds of early-blooming varieties of apples are beginning to show, but before they have fully separated.

The following birds have been observed feeding upon the larvae of the fruit-tree leaf-roller: The bluebird (*Sialia sialis*), western robin (*Planesticus migratorius propinquus*), catbird (*Dumetella carolinensis*), red-winged blackbird (*Agelaius phoeniceus phoeniceus*), orchard oriole (*Icterus spurius*), kingbird (*Tyrannus tyrannus*), phoebe (*Sayornis phoebe*) and English sparrow (*Passer domesticus*).

Parasitic insects reared from the larvae and pupae of the fruit-tree leaf-roller are:—*Pimpla pedalis*, Cress., *Itopectis conquisitor*, Say, *Epiurus indagator*, Walsh, *Meteorus archipsidis*, Vier., *Exorista nigripalpis*, Towns., *E. pyste*, Walk., *E. blanda*, O.S., and *E. cheloniae*, Rond. *Calosoma scrutator*, *Notorus monodon* and *Formica montanus* have been observed to prey upon the larvae and pupae.

Spraying experiments were made at Española, N. Mex., and Canon City, Colo., which showed that miscible oil ranging in strength from 1:10 to 1:20 gave the best results. Crude petroleum, kerosene and 10 per cent. distillate oil emulsions ranked second in effectiveness. Commercial lime-sulphur solution was found to be ineffective, as was whitewash. Arsenicals, alone or in combination with tobacco, were not altogether satisfactory. Vast numbers of moths were caught by means of light traps, but so far as could be determined there was little difference in the number of egg-masses laid on the trees in these orchards and in those in which traps were not used. Under orchard conditions there is no hope of controlling the leaf-roller by destroying the egg-masses by hand; but systematic spraying with miscible oil just before the buds burst in the spring, and in badly infested districts a second spraying with arsenate of lead (3lb. to 50 gallons of water), applied when the larvae are emerging from the eggs, will keep the pest under control.

MARCHAL (P.). **Rapport phytopathologique pour l'année 1912.**  
[Report on injurious insects in France during the year 1912.]  
—*Bull. Agric. de l'Algérie et de la Tunisie*, no. 9, 1st May 1913, pp. 193-199.

**Cereals.**—Cereals have not suffered greatly during the past year from the attacks of insects, but *Chlorops* has done some damage in Ariège, Elaterid larvae in the Loiret, Seine-Inférieure and Côtes-du-Nord, and *Agrotis* in La Vendée. Thrips continues to cause damage to wheat in the Indre. In Morbihan, *Tylenchus devastatrix* has done much damage to oats.

**Meadows and forage crops.**—Lucerne was badly damaged during April and May by *Colaspidea atrum* in the departments of the Aude, Pyrénées-Orientales and Bouches-du-Rhône, and in many places the first cutting had to be made prematurely in



order to save it. The second cutting has also suffered in the south especially in Haute-Garonne, Tarn-et-Garonne and Var. This pest has also made its appearance in Vendée at Fontenay-le-Comte. Vetches and other leguminous forage crops have suffered severely from aphid attack in Cerdagne, the Pyrénées-Orientales, Loir-et-Cher, la Sarthe, and l'Isère. In Tarn-et-Garonne the seed crops of clover suffered considerably from the attack of *Apion apricans* in July.

*Beet roots and potatoes.*—In the Aisne, *Silpha opaca* has been reported, but has not done very serious damage anywhere. The beet crops suffered from the attacks of *Haltica* in May and June in the following departments, Ille-et-Vilaine, Dordogne, Indre, Puy-de-Dôme, Tarn-et-Garonne, Gard and others; and *Aphis papaveris* has appeared in large numbers on the seed beet in Pas-de-Calais and Loiret. Professor Marchal points out that the habit of this insect of breeding upon the spindle-tree (*Euonymus*) makes it desirable that this tree should be eradicated in the neighbourhood of beet fields. The potato moth (*Phthorimaea operculella*) remains in the department of the Var round about Hyères, Carqueranne and Bornes.

*Kitchen garden crops* have been chiefly attacked by *Haltica*, which has done special damage to cruciferous plants and of these to sowings of cabbage and turnip in the following departments:—Pas-de-Calais, Côtes-du-Nord, Dordogne, Ardèche, Finistère, Ille-et-Vilaine, Puy-de-Dôme, Lozère, Corrèze. Peas and beans throughout the greater part of France have suffered seriously from aphid attack. The caterpillars of *Pieris* have been less numerous than in 1911, but they have nevertheless done great damage to cabbage crops in the centre of France, in particular in Aveyron and Cantal. In the Pyrénées-Orientales artichokes have suffered as in 1911 from the attacks of *Apion carduorum* and *Depressaria subpropinquella* (var. *rhodochrella*, H.S.). The green caterpillar of this latter species is known to the cultivators of the district under the name of the Artichoke Pyralis. Carrots have been attacked by the caterpillars of another species of the same genus, *D. marcella*, in the Bouches-du-Rhône (district of Saint-Remy), and this or a related species has also done much damage to fennel at different places.

*Fruit Crops.*—*Anthonomus pomorum* has destroyed the apple blossoms to a very large extent in Brittany and Normandy especially in the departments of Morbihan and Manche. The attack of this insect was exceedingly severe in Oise, Sarthe, Yonne, Puy-de-Dôme, Ardèche, Aveyron, Haute-Savoie and Dordogne. Throughout France in general fruit trees have suffered much from aphid. In Savoy the caterpillars of *Cheimatobia* have been abundant on apple trees; damage by them is reported from Sarthe, Yonne, Puy-de-Dôme, Aveyron and Gard. *Hyponomeuta malinellus* continues to increase on apple and almond trees in the department of Basses-Alpes. In the Bouches-du-Rhône the almond trees have also suffered severely. In the neighbourhood of Orleans the fruit trees have lost great numbers of branches through the attack of *Cephus pygmeus*, and in the Drôme the plum worm (*Carpocapsa funebrana*) has caused the early fall of

a large quantity of fruit. Blackcurrants in the Côte-d'Or have suffered much from the attack of *Trochilium tipuliforme*. As the growers do not burn the clippings the breeding of this insect is distinctly encouraged.

*Vineyards.*—*Clysia ambiguella* has done very little damage this year and the reports from all districts indicate that both caterpillars and insects have appeared in small numbers; nevertheless in certain places, especially the low damp grounds of the Mâconnais, Haute-Savoie, Bouches-du-Rhône and Hérault, they have appeared in considerable numbers. *Polychrosis botrana* has not done so much damage as in previous years, but has nevertheless continued its attack in a large number of vineyards. It has done serious damage especially in Beaujolais, the Mâconnais and Bordelais. New centres have appeared in the Pyrénées-Orientales, especially round about Banyuls. The caterpillars have appeared in abundance at Châteauroux near Angoulême and in the departments of Vienne, Ain and Gers. With the exception of the valley of the Loire and especially Loir-et-Cher and Loiret, *Oenophthira pilleriana* has been more or less scarce. A new *Tortrix* pest of the vine (making a fourth) *Cacoecia costana*, which had already been observed by Koerig in the Gironde, requires notice. Certain vineyards of the Camargue district have been seriously invaded this year by the omnivorous caterpillars of this moth. The damage done was quite equal to that caused by *Oe. pilleriana*, but fortunately the outbreaks were exceedingly local. Moisture seems to be an essential condition for its development, and there are two generations in the year. *Haltica* although reported everywhere, has caused less damage than in previous years and their early disappearance is partly attributable to *Sporotrichum globuliferum*. M. Picard has observed great numbers of this insect killed by the fungus in the neighbourhood of Montpellier. The second generation was however very abundant in the Saône-et-Loire and from one year to another the number of vineyards attacked by this pest in the department of the Rhône seems to increase. In the Côte-d'Or, *Haltica* has been reported from Beaune and Volney. *Byctiscus betulæ*, L., is diminishing and has only done appreciable damage in certain large vineyards on the banks of the Loire. The caterpillars of *Agrotis* were so numerous in the spring in the neighbourhood of Béziers as to cause great apprehension to the vineyard owners of Hérault, but fortunately most of them were killed by a bacterial disease and, excepting at certain places, the number of buds eaten was very much less than had been expected. Similar damage by the caterpillars of Noctuids had been reported from Vaucluse, Aude, Pyrénées-Orientales and also in the Marne, in a vineyard in the Valley of the Aude. *Phylloxera* has spread in a most disastrous manner throughout the Marne, favoured by the drought of 1911. Not only has it broken out in previously infected localities, but also in a large number of new centres. The pest has made great progress in the Meurthe-et-Moselle and communes which showed but one or two infected centres in 1910 can now show 30 or 40. 'Erinosis' has been very prevalent in the Aube, Marne, Côte-d'Or, Saône-et-Loire, Puy-de-Dôme, Yonne and Dordogne, and has



caused some damage by invading the grape clusters. *Nysius senecionis* has invaded many vineyards in the Hérault, Gard, Aude and Bouches-du-Rhône. The damage done has been especially evident in recently planted vines intended to be grafted or which had been recently grafted. In many places several hectares of vines have been withered up under the attack of myriads of these insects. Professor Marchal says that it is quite easy to prevent the damage done by *Nysius* by carefully weeding out all wild Cruciferae, which are their special food-plants, by hoeing between the vines in the month of May and *not* in the month of July.

*Southern Crops.*—The most important fact noted with regard to these crops is the appearance in the Alpes-Maritimes, near Beaulieu-sur-Mer, of *Icerya purchasi*, which appears to have been introduced about two years ago on plants coming from Naples, where there has been a breeding centre for this insect since 1900. The first specimens were received at the Entomological Station in Paris in the month of March 1912. Measures have been taken to introduce *Novius cardinalis* from Italy, Portugal and the United States, and the propagation of this natural enemy of *I. purchasi* in France may be regarded as an accomplished fact, and Professor Marchal is of opinion that there is now but little need to fear that the pest will make any great progress. *Diaspis pentagona*, though not always reported in France, has been found at Mortola on the frontier, though fortunately in an exceedingly localised centre. The olive fly (*Dacus oleae*) has caused serious damage throughout the whole of the warm portion of the littoral of the Alpes-Maritimes, and according to the olive-growers the invasion of this pest in the Gard has been greater than ever before. The arsenical treatment on the Cillis-Berlese plan has proved satisfactory when the olive groves are sufficiently isolated to prevent danger of re-infection. The olive *Tinea* has caused the fall of a large amount of fruit, especially in Vaucluse and Gard. According to M. Chapelle, nicotine sprays used as a preventive have given very much better results than arsenate of lead as an insecticide. *Simaethis nemorana* has multiplied to an extraordinary extent in Hérault and has done great damage to fig trees. The larvae of these insects have done special damage to the beetroot and potato in the departments of Saône-et-Loire, Doubs, Haute-Marne, Aisne and Morbihan. They have also been very abundant and have caused serious damage in the Isère and Hautes-Alpes. The insects themselves have been specially numerous in Haute-Savoie where the oaks have been largely defoliated by them, otherwise they have been relatively scarce over the greater part of France.

NAVAS (L.). *Crisópidos sudamericanos*. [South American Chrysopidae.]—*Brotéria, Salamanca*, Ser. Zool., xi, fasc. 2, June 1913, pp. 73-104.

The first part of a systematic list of South American CHRYSOPIDAE, of which 40 species are described, comprising one *Chrysopiella*, one *Hypochrysa*, 13 *Leucochrysa*, and 25 *Chrysops*.

CARCANO (P.). **Il pidocchio sanguigno del malo.** [The Red Apple Aphis, *Schizoneura lanigera*.]—*La Rivista di Viticoltura, Enologia ed Agraria, Conegliano*, (5) xix, no. 3, 1st Feb. 1913, pp. 67, 68.

In Italy the best time to attack the Aphis is in March, by cutting off and burning those branches on which the largest numbers are to be found. So far as possible the larger branches should be brushed in the same way as has been recommended for *Diaspis pentagona*, and the parts attacked treated with an insecticide. The following is recommended:—heavy oil of tar  $1\frac{1}{2}$  oz., soap 5 oz., water 1 gallon. The water and soap are boiled together and the oil of tar slowly added the while. This mixture should be laid on with a brush and thoroughly stirred each time the brush is dipped into it, and it is also advisable that it should all be used within two days, as it has a tendency to lose its effect if kept. Special care should be taken to treat the part of the trunk just above and just below the ground. The author further recommends that the branches should be sprayed with a three per cent. soap solution, and that in the spring the whole tree should be sprayed with a two per cent. solution of “pitteleina” or “rubina.”

**La coltivazione del Piretro.** [The cultivation of Pyrethrum.]—*La Rivista di Viticoltura, Enologia ed Agraria, Conegliano*, (5), xix, no. 4, 15th Feb. 1913, p. 94.

Insecticides having pyrethrum for their basis are not very generally used, as the high price of pyrethrum powder operates adversely to their employment. At present *Pyrethrum cinerariaefolium* is cultivated almost exclusively on the eastern coast of the Adriatic in Dalmatia, Montenegro and Albania, and not in Italy.

It is suggested by E. Cirelli that the plant may be easily cultivated on the Italian side of the Adriatic as it is a hardy plant, bears both drought and cold well, and thrives in a dry, loose soil. The seeds are sown in the spring and the seedlings planted out in the autumn. According to Cirelli there is a profit of from £120 to £140 per hectare (2.47 acres) on its cultivation. There is however one difficulty to which attention has been drawn more than once, namely that of procuring seed.

MARTINI (S.). **Sulla lotta contro le Tignuole dell'uva.** [The struggle against the Vine Tineids.]—*La Rivista di Viticoltura, Enologia ed Agraria, Conegliano*, (5) xix, no. 8, 15th April 1913, pp. 178-179.

The Technical Institute at Arezzo has made experiments as follows on four plots:—

- (a) was treated with a simple copper lime spray;
- (b) with a mixture of “rubina” 3 lb., sulphate of copper 2 lb., water 20 gallons;



(c) Bordeaux mixture with one per cent. of creolin; and

(d) Bordeaux mixture with two per cent. of carbolised extract of tobacco.\*

The spraying was done on the 10th July and the examination on the 28th August yielded the following results:—

(a) 1,160 bunches, 280 attacked, equal to 24 per cent.

(b) 1,168 bunches, 92 attacked, equal to 7·87 per cent.

(c) 1,180 bunches, 80 attacked, equal to 7·77 per cent.

(d) 1,140 bunches, 64 attacked, equal to 5·61 per cent.

SWAINE (J. M.). **Tent Caterpillars.**—*Dept. Agric. Dom. Canada, Div. Entomology, Entom. Circular no. 1, 1913, 14 pp., 8 figs.*

Outbreaks of the Tent Caterpillars *Malacosoma americana*, F., and *M. disstria*, Hübn., occur from time to time in different parts of Canada, causing serious damage. This has been the case during the past two years in the provinces of New Brunswick, Quebec, Ontario, and British Columbia. *M. americana* is most common on fruit trees, wild cherry and hawthorn, but when very abundant it readily attacks a variety of shade and forest trees. *M. disstria* prefers poplar, birch, elm, oak, maple and other forest trees. It is also found in orchards, particularly in years of great abundance. In 1912 these two species, and especially the latter, have stripped many thousands of trees in the districts named. Square miles of poplar and birch have been completely defoliated. Last summer it was not uncommon for trains on the Gatineau River line to be stopped by myriads of caterpillars swarming on the rails, which were effectively greased by their crushed bodies; similar cases are reported from New Brunswick and British Columbia. Both species are native, and there are records of outbreaks in Massachusetts as early as 1646. The habits and life-history of both species are described, and the figures amply illustrate the caterpillars and the manner in which the eggs are laid on twigs. The author gives a long list of birds which are said to feed to a greater or lesser extent upon the eggs and caterpillars and greatly assist in reducing their numbers. He urges that the native birds of Canada should be protected on account of their value in keeping down insect pests. Among the artificial methods of control the destruction of the egg-masses before the 1st April is useful, but is only profitable on the more valuable fruit and shade trees. The forest tent caterpillar will usually drop to the ground if the branches of the tree be jarred, and this method is also of some service, provided that the caterpillars are carefully collected and destroyed. Banding the trees with tanglefoot and other sticky mixtures is also useful, but requires constant renewal. The nests may be destroyed by long-handled tree-trimmers or by burning with a torch. Asbestos fibre soaked in petroleum and placed in a tin can nailed to the end of a pole is said to make an

\* "Estratto fenicato di tabacco" is a preparation of tobacco juice, to which a certain portion of phenol is added to prevent its use for other purposes, sold by the Italian Government to agriculturists.—ED.

excellent torch. The burning method however requires considerable care in use. Petroleum emulsion will kill the caterpillars if applied directly with a sprayer. The cocoons may be also collected. The author suggests that these should be placed in a box covered with a coarse wire netting, with a mesh of 3/16ths of an inch. This will allow useful parasites to escape. If sprays are used, Paris green or lead arsenate (2 lb. to 40 gals. of water) are recommended. The former mixture is directed to be made as follows:—Paris green 1 lb., best quick-lime 2 lb., water 160 gals.; the Paris green and the slaked lime are carefully mixed together and then the whole made up to the quantity required; the mixture requires to be constantly stirred when in use.

DALMASSO (G.). *La Lotta contro la Diaspis pentagona nel Giappone e in Italia.* [The struggle against *Diaspis pentagona* in Japan and in Italy.]—*Rivista di Viticoltura, Enologia ed Agraria, Conegliano*, (5) xix, no. 2, 15th Jan. 1913, pp. 38-40.

It has been thought for a long time that this pest, imported into Europe from Japan, was not the cause of much loss in its native country, but the contrary is the case, in spite of the presence there of natural parasites in such numbers as to constitute a more or less effectual check on its development. For the past ten years artificial means have been in use for keeping it under control, and Sasaki in describing *Diaspis patelliformis* in Japan gives the following methods which he advises to be used against *Diaspis pentagona*:—

(1) To rub the affected parts of the stem or trunk of tree attacked with bunches of straw, and then to paint over these parts with petroleum or a mixture of  $\frac{1}{4}$  oz. of soap to a quart of petroleum with a little water added.

(2) To spray or brush over the plants with the following mixture:—Sulphur  $\frac{1}{2}$  oz., quick-lime 8 oz., water 4 gallons; the whole to be thoroughly boiled together.

(3) Fumigate all plants received with hydrocyanic acid for from three-quarters of an hour to an hour, before planting out.

The author (G. Dalmasso) lays great stress on thorough brushing and painting of the trees with insecticide emulsions having oil of tar for a basis. The brushing should be done in the winter with strong wire brushes, and at this season there is no necessity for collecting and burning the fragments of bark, because then only the legless females are present which are incapable of climbing up the plants. He remarks that there are large numbers of proprietary anti-Diaspis remedies on the market, many of which are of doubtful value, but he mentions the following mixture as being very useful:—Water 20 gallons, heavy oil of tar 11 pints, common turpentine 1 pint, 14 lb. of common salt, and 2 lb. of flour; the salt is dissolved in the water and the flour is added and then the oil of tar. A Milan firm prepares a special



quality of oil of tar called "eusol," but where this is used 100 grms. of salt, instead of 700, as in the previous formula, is sufficient. Both these emulsions are said to be very stable and may be kept for a long time. They are best applied on a damp and cloudy day in winter.

KERSHAW (J. C.). **Froghoppers.**—*Dept. Agric., Trinidad*, Special Circular nos. 4 and 5, 3rd March 1913, and no. 6, 27th March 1913.

The cane-fields in Trinidad seem deficient in insects and spiders which prey on the adult frog-hopper, although they are very plentiful on adjoining grass-land. It would therefore be advantageous in large cane-fields to leave a small plot of cane ( $\frac{1}{2}$  acre) uncut about the middle, in which beneficial insects might find a refuge and breed, and whence they could later on spread over the new cane. The planting of trees and shrubs on waste ground adjoining cane-fields would encourage the spread of the Tick-bird (*Crotophaga ani*) and other useful birds.

The failure of carbon bisulphide as an insecticide for frog-hopper nymphs is partly due to the protection afforded by their spittle and the fact that the tergal plates and pleura of the abdomen are greatly produced and bent around the underside of the abdomen till the opposing ends touch one another, thus forming a large air-chamber or reservoir. The air contained in the chamber is sufficient to last the nymph for some considerable time.

Throughout the dry season in Trinidad—so far as ascertained to the end of March—the frog-hopper continues to breed, though in much smaller numbers than in the wet season, and chiefly amongst grass in damp localities. The chief damage to young cane is caused by the attacks of the nymphs on the roots, yet if present in very large numbers on the leaves, the adults do much damage, because of the large amount of sap which they drain from the tissues of the plants. The egg-parasites of the frog-hopper having been found on sugar estates, it seems advisable not to destroy the trash, but to leave it as long as possible on the fields, till it is required to be used as a fertiliser. This will give the parasites a chance of hatching out and escaping; and if the trash is left and not piled into 'boucans,' it is, in the author's opinion, unfavourable rather than otherwise to the frog-hopper eggs.

BURGESS (A. F.). **The Dispersion of the Gipsy Moth.**—*U.S. Bureau of Entomology*, Bull. no. 119, 11th Feb. 1913, pp. 1-62, 3 figs., 16 plates, 4 maps.

This paper is the result of extensive studies made to determine the means by which the gipsy moth has spread in the New England States, causing, as is well known, enormous injury to gardens and forests. From the Medford, Mass., district in 1869, the pest had spread in 1912 as far north as Whitefield, Me., west to the Connecticut River, and south to Newport, R.I.

Suppression measures were abandoned by the State of Massachusetts in the winter of 1900; subsequent severe caterpillar outbreaks, however, which not only destroyed woodlands, but even made houses uninhabitable, led to the organisation, early in 1905, of a State scouting force which reported (1912) that 10,900 square miles are infested with the pest.

It is impossible to give a detailed description of the cause of every infestation. The weather records provide strong evidence that the wind is responsible in a large degree for the spread of the gipsy moth, other means of dispersal being driftwood, vehicles (especially motor-cars), clothing and, to a negligible extent, birds. Numerous experiments were made, with the assistance of the U.S. Bureau of Entomology, regarding dispersal by wind. One condition favouring wind-spread is the presence of large woodland colonies which are overpopulated with caterpillars. This stimulates activity on the part of the insects in search of food and affords opportunities for them to be carried away by the wind. Weather records for the past ten years show that the prevailing winds during April and May, when the temperature is high enough to make the caterpillars sufficiently active, are for the most part from the south and south-west. The character of the food supply has a very important bearing on the dispersion of the gipsy moth, because the caterpillars will not survive unless they are able to find lodgment on favourable plants. First-stage caterpillars cannot survive on pine foliage, and large blocks of Coniferae or other unfavourable food-plants will prevent the establishment of the insect. National legislation should provide for the inspection of lumber products or other material which is likely to carry the gipsy moth from the infested area in New England to distant points in the United States. The scouting work, which has to do with the determination of the limits of the spread of the pest, is of great importance. This is being carried on in the infested towns on the margin of or outside the infested area, and too much stress cannot be laid on its thorough prosecution. The men actively engaged in it should be instructed thoroughly in regard to the best methods of thinning woodland, so that practical advice can be given to the owners of forest land to stimulate them to take proper measures for protecting their property before the infestation becomes serious enough to cause severe injury.

The text is accompanied by photographs illustrating very clearly the ravages caused by the gipsy moth, its egg-clusters and the screen-traps used in testing the dispersal of caterpillars by wind. One large coloured map and three smaller maps in the text show the dispersion and present distribution of the gipsy moth in New England.

VERCIER (G.). *Les Fraisiers à gros fruits*. [Large-fruited strawberries.]—*La Vie Agricole et Rurale, Paris*, ii, no. 13, 1st March 1913, pp. 371-374.

The author notes as insects injurious to strawberry crops:—The "ver blanc," which he says is very difficult to destroy; *Otiorrhynchus sulcatus*, which eats the leaves during the night,



but is not a very common pest; and *Rhynchites fragariae* (la lissette), which cuts the petioles of the leaves and the stalks of the flowers. He recommends spraying the leaves, before the fruits are formed, with a one per cent. solution of lysol. Against *Tetranychus telarius* (Red Spider), which is specially common on strawberry plants grown under glass, the best remedy is spraying with an aqueous solution of nicotine.

OMNIS (—). **Contre les Anthonomes.** [The destruction of *Anthonomus pomorum*.]—*Moniteur d'Horticulture, Paris*, xxxvii, no. 6, 25th March 1913, p. 72.

The destruction of *Anthonomus pomorum* is notoriously difficult, and the author describes a method by which it is possible (allowing 150 insects per tree) for three men to destroy about 15,000 of them per diem, and which has the merit of simplicity. A tarpaulin is slit to the centre and provided with a circular hole in the middle so as to fit round the trunk of the apple tree. The tree is then shaken and the insects collected on the tarpaulin are destroyed with boiling water or with some benzine, or essence of turpentine. This procedure may be assisted by fumigation or by spraying with weak solutions of paraffin oil, vinegar or lysol.

PAQUE (E.). **Le Puceron lanigère.** [Woolly Aphis.]—*Rev. Mens. Soc. Entom. Namuroise*, March 1913, pp. 39-39.

The author says that he has made use of a method described by M. R. Geerinckx in the Flemish journal, "De Toekomst," with success. A stiff brush soaked in Carbolineum was used for brushing the aphides from the trees, and the place occupied by them and all rough places and cracks in the bark were carefully treated with the same material.

**The Plantations Preservation Decree.**—*The Zanzibar Gazette*, 28th April 1913.

Any person who is in charge of any land whereon are coconut trees shall, whenever any such tree is dying or dead or attacked by any insect (i.e. *Oryctes rhinoceros*) or parasite (i.e. 'Kirukia,' a *Loranthus*), cause the same to be consumed by fire or to be buried in the ground at a depth of not less than three feet, or to be entirely submerged in water, or to be otherwise disposed of in such manner as the Inspector may direct.

HENDERSON (Prof. J.). **The Practical Value of Birds.**—*Univ. of Colorado, Boulder, Col.*, Bull. no. xiii, no. 4, April 1913, 48 pp.

This is a useful introduction to American economic ornithology, and the author in discussing the dangers resulting from man's interference with the balance of nature, either by destroying species or introducing alien species into a new habitat, points out the

irrationality of recklessly killing birds by the hundred thousand for 'sport' and millinery. If the birds were all destroyed, agriculture in the U.S.A. would instantly cease on account of insect and other pests. Birds which ordinarily take small numbers of insects, take them in much larger quantities when they are abundant. The number of species and subspecies of birds in the various states of the Union ranges from about 325 to 530, the latter number being credited to California, while 403 are claimed for Colorado. A discussion of the nature and quantity of stomach contents of birds, and the necessity of bird protection is followed by an account of the species investigated, which occupies the second half of the bulletin and contains valuable statistical evidence. Not the least useful part is a bibliography containing about 150 references to papers dealing with the relation between birds and insects and other pests.

**Le Scorie Thomas nella lotta contro i Pidocchi delle Barbabietole**  
[Basic Slag, a remedy against the beetroot aphid.]—*Rivista di Agricoltura, Parma*, xix, no. 20, 15th May 1913, pp. 309-310.

The use of basic slag in fine powder against the beet and corn aphid has been reported by several German beet-growers as productive of good results, if strewn over the fields at the rate of 300 to 400 kgs. (661 to 882 lb.) per hectare (2·47 acres), and it is said that in about eight days after this treatment the aphid disappears. Prof. D. Cavazza, of Bologna, has made use of this remedy with good effect on beans and has also obtained encouraging results against the *Oidium* of the vine.

**THEOBALD (Prof. F. V.). Some New and Unusual Insect Attacks on Fruit Trees and Bushes in 1912.**—*Jl. Board of Agric., London*, xx, no. 2, May 1913, pp. 106-116, 2 figs.

Amongst insects of special interest is an Apple Leaf Sawfly (*Lygaeon ematus moestus*, Zaddach) hitherto unrecorded from Great Britain, and two new aphides, *Myzus fragariae*, sp. n., on strawberries and *Rhopalosiphum brittenii* on currants. The Beech Orchestes (*Orchestes fagi*) has been found feeding on apples in Devonshire, and the Ash and Willow Scale (*Chionaspis salicis*) attacking currants at Woburn and Wye. The Garden Chafer (*Phyllopertha horticola*) has been recorded as attacking apples; the Board of Agriculture having records of this beetle attacking apples, pears, raspberries, strawberries and currants. The V-moth (*Italia vararia*) has been found on currants and gooseberries in Bedfordshire. In Suffolk and Hereford a new Capsid (*Atractonotus* sp.) has been damaging apples. The Pear Leaf-curling Midge (*Cecidomyia pyri*, Bouché) has done considerable damage in one locality near Maidstone to all varieties of pear trees, though some showed a greater resistance than others. The spreading of one of the naphthaline preparations beneath the trees when the larvae fall to the earth would be a useful remedy. The Sycamore Coccus (*Pseudococcus aceris*) has been recorded as



attacking apples at Boughton Aluph and birch trees at Godalming. The dark green *Ribes Aphis* (*Aphis grossulariae*, Kalt.) has been very destructive from Cumberland to Devonshire, causing the tops of shoots of gooseberries and currants, especially red currants, to become much stunted and producing a dense tuft of terminal leaves. Nothing but actually dipping of the attacked tips in tins of nicotine wash or paraffin jelly has any effect. This aphid frequently ruins the growth of young gooseberry bushes. In 1911 apple leaves from several localities showed a somewhat obscure diseased appearance. A certain amount of Red Spider (*Bryobia* sp.) occurred, but the damage did not resemble the typical *Bryobia* attack, the leaves being blotched with irregular brown and dark spots. In August 1912 leaves of several varieties of apples similarly attacked were received from Sevenoaks, and beneath these were found short, thick, almost conical, yellow mites belonging to the genus *Epetimerus*, and closely allied to, if not identical with, either *E. armatus*, Canestrini, found on *Crataegus oxyacantha*, or *E. malinus*, Nalepa, found on apples. The mites are easily destroyed by spraying with paraffin jelly.

CHAPAZ (G.). *Les bouillies mouillantes*. [Sprays of high wetting power.]—*Bull. Agric. de l'Algérie et de la Tunisie, Algiers*, 1st May 1913, pp. 187-191.

This paper is a lengthy résumé of one recently published by M. Ravaz in the 'Progrès Agricole et Viticole,' upon his experiments on the wetting power of various spraying mixtures.

Soap mixtures are of real value but they have this inconvenience, that they are always more or less costly and require care in preparation. The formula of Vermorel and Dantony for what is known as Burgundy mixture with soap, is still said to be one of the best, and is as follows:—Sulphate of copper, 2 kgs. ( $4\frac{1}{2}$  lb.); washing soda, 1.2 kgs.; white soap or oleate of soda, 2 kgs.; the copper sulphate is dissolved in 50 litres of water the carbonate of soda in 25 litres separately and added to the former very slowly with vigorous stirring, so as to prevent the formation of soluble carbonate of copper; lastly the 2 kgs. of soap, carefully dissolved in the 25 litres of water, are added to the whole, the resulting mixture should be alkaline. The writer refers at length to the original paper of Vermorel and Dantony, (C.R. Acad. Sci. Paris, 13th May 1912) and to papers by Astruc and Philipponat dealing with the details of preparation of many of these mixtures. Weinmann says that a neutral or alkaline Burgundy mixture to which  $\frac{1}{2}$  kg. of alkaline polysulphides and  $\frac{1}{2}$ -1 kg. of white soap has been added has great wetting power. The above quantities suffice for a hectolitre, and he says that they may be prepared without difficulty, the polysulphide being added at once with vigorous stirring; the soap should be melted hot with sufficient water in a separate pot and while still boiling slowly added to the above mixture with constant stirring. If properly done, there is no fear of the formation of lumps of copper soap compounds. The precipitate of polysulphide of copper is so exceedingly fine that it remains for a long time in suspension.

A preparation of mixtures in which resin is made to take the place of soap is also discussed. Chapaz says that a wetting property of great power could be communicated to these mixtures by the use of Sapindus nuts (soap nuts) or by Saponaria bark which can be easily obtained in Marseilles. He says that if the nuts are not previously shelled, but only broken, it must be remembered that the shells constitute 64 per cent. of the fruit. In order to prepare the mixture the shells are boiled for half an hour in water (2 or 3 litres for every 400 grms. of shells), at the end of which time the liquor is strained and used for the preparation of the mixture. He gives the following formula:—Sapindus shells, 400 grms.; petroleum, 500 grms.; sulphate of copper, 2 kgs.; carbonate of soda, 1 kg.; water, 100 litres. The sulphate of copper is dissolved and poured into the decoction of nuts, and the carbonate of soda added last.

Vermorel and Dantony advise the following as being of great wetting power: neutral acetate of copper, 1 kg.; gelatine, 10-20 grms.; water, 100 litres. The acetate is first dissolved and the gelatine, previously dissolved in water, is added afterwards. Glue or painters' size may be used instead of gelatine, provided a larger quantity be employed, that is to say, 50-100 grms.

GAHAN (A. B.). **New Ichneumonoidea Parasitic on Leaf-mining Diptera.**—*Canadian Entomologist*, xlv, no. 5, May 1913, pp. 145-154.

The author describes the following:—**BRACONIDAE:** *Opius utahensis*, sp. n., found at Salt Lake, Utah; host, *Agromyza parvicornis*.—*Opius suturalis*, sp. n., found at Tempe, Arizona; host, *Agromyza pusilla*.—*Opius aridis*, sp. n., also found at Tempe, and parasitic on the same fly.—*Opius bruneipes*, sp. n., found at Lakeland, Florida; host also *A. pusilla*.—*Opius succineus*, sp. n., found at Lafayette, Indiana; host, species of *Agromyza* mining leaves of *Panicum*.

**ALYSIIDAE:** *Dacnusa scaptomyzae*, sp. n., found at College Park, Maryland; host, the dipterous leaf-miner, *Scaptomyza flaveola*, Mg.—*Dacnusa agromyzae*, sp. n., found at Lafayette, Indiana; parasitic on *Agromyza angulata*.

STAUDER (H.). **Beiträge zur Biologie der Raupen von *Lymantria dispar*, L., und *Phalacropteryx praececellens*, Stgr.** [Contributions to the biology of the caterpillars of *Lymantria dispar* and *Phalacropteryx praececellens*.]—*Zeits. für Wissenschaftl. Insektenbiologie*, ix, no. 5, 20th May 1913, pp. 148-151.

In the course of his duties as a railway official in Spalato, Dalmatia, the author had occasion to report a goods train held up between Knin and Siveric on account of 'worms' on the rails. Inquiries elicited the information that every year in June the



morning goods train had to be stopped between those stations because of a mass of gipsy moth caterpillars, about 15-20 cm. in diameter and 100 to 200 metres in length which moved slowly onward and had to be swept off the rails before the train could proceed. The surrounding country is covered with oak scrub and undergrowth, of which the author witnessed the process of defoliation by the gipsy moth at a rate of about 5 to 10 square kilometres a day. Completely defoliated oaks were also observed near Repentabor, Dutvolje-Skopo, Dugopolje and Sinj; in Middle Dalmatia, and near Pinguente and in the Draga Valley in Istria. Clusters of more than 2,000 eggs were by no means rare and the damage to the oak trees of the Karst is enormous; the authorities, however, seem to be apathetic as regards the ravages of *Lymantria*.

MAYNARD (P.) & FREDERICK (T.). *Culture de l'Artichaut dans le sud-ouest de la France*. [Artichoke-growing in S.W. France.] —*La Vie Agricole et Rurale, Paris*, ii, no. 28, 14th June 1912, p. 47.

Among the parasites damaging these plants the authors mention the grubs of cockchafers as eating the roots and advise as a remedy the collection of the beetles. A green beetle of the genus *Cassida* eats the leaves and heads, and whole plantations are often destroyed by the larvae. Collection of the adults is at present the only remedy, as the authors say that insecticides have but little effect. The leaf aphid does little harm and can be got rid of by nicotine sprays or soap-suds, and the species which attacks the stem at its exit from the ground is destroyed by earthing up; an emulsion of petroleum (200 grms. soft soap, 100 grms. washing soda, 200 c.c. petroleum, 10 litres water) is also said to be very effective.

PAILLOT (A.). *Le ver des pommes (Carpocapsa pomonella)*.—*Rev. Phytopathologie Appliquée, Paris*, i, 5th June 1913, pp. 1-4, 3 figs.

After giving the history and biology of this pest at some length the author describes the various methods of attacking it in general use and strongly recommends that the advice of Decaux should be followed, *viz.*, the immediate collection of all windfalls, as it is known that the larva quits the apple within 24 hours of its fall; the thorough hoeing and raking of the soil between and under the trees and the collection and burning of all leaves, bark and rubbish. Turning the soil to a depth of 6 inches is said to bury any pupae that may exist deep enough to prevent the imago from ever reaching the surface. These methods are simple and cheap, and are said to be very effective supplements to the usual lime-washing, banding &c.

PARKER (W. B.). The Red Spider on Hops in the Sacramento Valley of California.—*U.S. Bureau of Entomology*, Bull. no. 117, 3rd May 1913, 41 pp., 9 figs., 6 pls.

During the past few years the 'red spider' (*Tetranychus bimaculatus*, Harvey) has become recognised as one of the most injurious of hop pests on the Pacific Coast, especially in the Sacramento Valley, Cal. It was reported from Wheatland, Yuba Co., Cal., in 1902 and since then has damaged hop-fields near Sacramento every year, one company estimating their financial loss due to this mite (allowing 14 cents per lb. for hops) to be from \$10 to \$68 per acre. Other growers suffered an even greater loss, the hops sometimes being so badly injured that they could not be picked at all. In the state of Washington the fight against the pest has been hopeless, and a certain amount of damage has been done to hops by the mite at Agassiz, B.C.

Extensive experiments were carried out at Berkeley, Cal., in order to determine the life-history of *T. bimaculatus*. The eggs are laid singly and are not attached to the host plant by protecting webs, as are the eggs of the citrus 'red spider' (*T. mytilaspidis*, Riley), but are held by strong filaments or are to be found on the loose web which is ordinarily spun under infested leaves. The incubation period varies from  $4\frac{1}{2}$  to 10 days, according to temperature and general climatic conditions. Females were isolated on leaves to determine whether parthenogenesis takes place, and it was found that of 33 eggs deposited by these virgin mites all of the 26 that hatched were males.

The web, which is spun by either sex indiscriminately across the underside of the infested foliage, affords the mites much protection against wind, rain or sprays. It was proved that the 'red spider' passes the winter upon wild plants in and around the hop-fields, and the pest thrives upon nearly every form of vegetation in which the underside of the leaf is not so hairy as to prevent its attack on the leaf tissue proper. Laboratory experiments showed that *T. bimaculatus* is capable of progressing along 211 feet of hop-leaf surface in 10 hours, or 10 to 60 feet over bare soil, according to the roughness of the latter.

The mites damage the hop-vine by sucking the juices from the cells, leaving yellow spots, and lessening the vitality of the plant. This causes a premature ripening of the hops, and in severe cases makes the hop-cones brittle, weakens the roots and decreases the crop of the following year. The only probable means of distribution, other than the natural migrations, are by horses used in cultivating, or by the men, and possibly on the bodies of the larger insects found on the hop-vines.

Among the predaceous insects, which, however, have no appreciable effect upon the infestation of the 'red spider,' are *Triphleps tristicolor*, White; *Scymnus nanus*, Lec.; *S. marginicollis*, Mann.; *Pentilia* sp. and *Chrysopa californica*, Coq., the last in the larval stage being the most effective of all. The mites on hops are not affected by any form of dry sulphur, but are readily killed by several contact insecticides, the cheapest and most convenient of which are flour paste (8 : 100), or a combination of lime-sulphur, 36° Baumé (1:100) and flour paste



(4 : 100). To get the best results the lower foliage of the vines should be stripped and the vines thoroughly and rapidly sprayed immediately afterwards. The infested area should be sprayed a second time seven or ten days later. Banding the vines with tanglefoot will check migrations, especially when the hop-fields contain many weeds. Continual spraying with water will check the mite on roses and carnations, while fine sulphur is effective on sweet peas. Pumpkins, squashes, cucumbers, violets, chrysanthemums and box-elder are easily protected by the flour paste (8 : 100). Instructive photographs accompany the text, and as *T. gloveri*, Banks, and *T. telarius* are probably synonymous with *T. bimaculatus*, the more important references to those species are included in the bibliography.

PARKER (W. B.). **The Hop Aphis in the Pacific Region.**—*U.S. Bureau of Entomology*, Bull. no. 111, 6th May 1913, 43 pp., 8 figs., 10 pls.

The hop aphis (*Phorodon humuli*, Schrank), known for a long time in Europe, first appeared in New York in 1863 and reached the Pacific Coast in 1890. The greatest injuries from this pest occur in California, Oregon, Washington and British Columbia. In 1911 the loss due to the aphis in two large yards in the last-named State was estimated at \$80,000, and in 1912 about \$124,000 worth of damage was done in Oregon. The hop aphis injures the crops in two ways: by extracting the plant juices it prevents the normal growth of the plant, and by the excretion of honey-dew, on which grows the black-smut fungus (*Cladosporium* sp.), it injures the quality of the crop. Investigations regarding the economical control of the hop aphis were carried out at Santa Rosa, Cal., and Independence, Oreg.

The winter eggs are laid by the oviparous female on buds or leaf-scars of plum, prune, sloe or hop, and hatch about the same time in the beginning of April. The insects which emerge from the sexual eggs are wingless viviparous females ('stem-mothers'). They are 1.5 to 2 mm. in length, whitish green, and the antennae are set on characteristic frontal tubercles. Being very prolific they are capable of populating several leaves in a very short time. Winged aphides appeared about a fortnight after the first wingless insects were observed. The winged aphides which mature on the plum are the first migrants, and may travel some distance when aided by a light wind. The winged form which produces the sexual female migrates in the autumn from the hop to its winter host (plum, prune or sloe).

Hop aphides are usually found on the underside of the leaves and may be observed gradually working up the vines and inside the cones. Large black ants (*Formica subsericea*, Say) were observed to carry the aphides to the newly expanded leaves, and they were so active at Santa Rosa, Cal., that it was found necessary to put tanglefoot on the vines to prevent the latter from being reinfested. It was found that a hot dry wind is very unfavourable to the aphides and may sometimes materially check infestation.

Parasites and predaceous insects destroy the hop aphides in large numbers, but do not successfully control them. *Hippodamia convergens*, Guér., *Coccinella californica*, Mannh., *C. abdominalis*, Say, and *Chilocorus orbus*, Cas., were frequently found among the aphides. The larvae of *Syrphus opinator*, O.S., and *S. americanus*, Wied., and the predaceous bug *Triphleps insidiosus*, Say, were also found. At Richfield, N.Y., *Adalia bipunctata*, L., *Stethorus punctum*, Lec, *Camptobrochis nebulosus*, Uhl., and *Anthocoris* sp. were observed attacking the pest.

The hop aphid is readily killed by several contact insecticides, e.g., tobacco decoctions with whale-oil soap, and quassia chips with whale-oil soap. The formulae for such insecticides, methods of preparation and application are described in detail. The cost of spraying one acre, according to density of foliage, is \$5.38 for 300 gals. and \$6.79 for 500 gals. of nicotine sulphate (1 : 2,000), and flour paste (4 : 100). One application of quassia chips (8 lbs.), whale-oil soap (6 lbs.) and water (100 gals.) costs \$5.65 and \$7.25 per acre respectively. Proper stripping of the vines to about four feet above the ground, picking off infested leaves, irrigation, and the use of fertilisers, are valuable aids in controlling the aphid. The spraying operations must not be delayed and all the leaves of the vines must be wetted on both sides. It is more economical to waste a little material than not to apply enough. The more important writings on the hop aphid are referred to in a bibliography.

MACDOUGALL (Dr. R. S.). **The Red Clover Gall Gnat.** *Amblyspatha ormerodi*, sp. nov., Kieffer.—*Jl. Board of Agriculture, London*, xx, no. 3, June 1913, pp. 225-230, 6 figs.

From November 1912 to March 1913 the Board of Agriculture and Fisheries received numerous complaints of the dying of red clover (*Trifolium pratense*), chiefly from Norfolk, Suffolk, Essex, Lincoln, Huntingdon, Cambridge, Surrey, Hereford and Shropshire. In practically all the samples received red maggots of a Cecidomyid were found, which belong to the same species mentioned by the late Miss Ormerod in her Report for 1889, and the flies bred from the maggots have been identified by Professor Kieffer as *Amblyspatha* sp. The eelworm, *Tylenchus devastatrix*, was also almost invariably found in or about the diseased plants. Enchytraeid worms, larvae of *Camptocampus aterrimus*, of *Sciara*, of *Sitones*, *Collembola* and *Sclerotinia sclerotiorum* occurred occasionally. The gall-midge maggots were found in the tap-root, at the apex of the plant, at the ground level, in some of the withered and browned side-shoots, in unopened leaflets and in unexpanded buds. Large numbers of the larvae preparing for pupation and a few pupae were found in the soil. Two other Cecidomyid enemies of clover are known in Britain, the clover leaf-midge, *Dasynura* (*Cecidomyia*) *trifolii*, on white clover (*Trifolium repens*) and the clover seed-midge, *Dasynura* (*Cecidomyia*) *leguminicola*, on red, white and Alsike clover. As regards the attacks by the red clover gall-gnat, the symptoms of the clover plants often resemble those due to eelworm attacks; but from



the large numbers of the Cecidomyid larvae and their position. *A. ormerodi* must be regarded as a direct and distinct enemy of red clover. The disease generally appears when there is an abundant autumn growth in the plants after the corn is cut. It was found that there is no disease on those parts of the field which are fed off closely by sheep, so that it would be wise to have the clover, which grows after the harvesting of the cereal crop, cut or eaten off by sheep. Badly infested plants should be ploughed in deeply. Plants that look poor in winter may recover, as red clover is a hardy plant.

SHERMAN (F.). **The Meloidae (Blister-beetles) of North Carolina.**—*Entom. News, Philadelphia*, xxiv, no. 6, June 1913, pp. 245-247.

This list, which is believed to be reasonably complete, shows a total of 21 species of MELOIDAE on record in N. Carolina. *Epicauta cinerea*, Först., has damaged clematis. *E. marginata* also damages clematis, as well as egg-plant and potato, and has been found on tomato and amaranthus. *Macrobasis unicolor*, Kirby, is not uncommon under lupins at Southern Pines. *Meloe impressus*, Kirby, has been complained of as a pest of turnips. An undetermined species of *Meloe* has been found feeding on cotton and clover. *Pomphopoea aenea*, Say, has been found under maple trees, and in 1903 was exceedingly abundant on blossoms of peach and plum, later reports stating that when oaks bloomed they left the fruit trees for the oak catkins. *P. unguicularis* swarmed in thousands at Blowing Rock (1901), eating the blossoms of mountain laurel (*Kalmia*) and the leaves of peach, apparently preferring those that were affected with leaf-curl. *Tetraonyx 4-maculatus* is at times common on the butterfly pea and wild sweet potato (*Ipomoea pandurata*).

EVANS (W.). ***Ortheziola rejdovskyi*, Sulc., a Coccid New to Scotland, in the Forth Area.**—*Scott. Naturalist*, June 1913, pp. 142-143.

In crevices of rocks facing the sea at Archerfield Links, near Dirlerton, Haddingtonshire, the author found several specimens of a Coccid, subsequently identified by Mr. E. E. Green as *Ortheziola rejdovskyi*, Sulc. This Coccid has previously been recorded only from Bohemia (1894) and from an ants' nest in Somerset (1911).

FABER (P.). **Der Heu- und Sauerwurm und seine Bekämpfung im Grossherzogtum Luxemburg.** [The Vine Moth, *Clysia ambiguella*, Hb., and its control in Luxemburg.]—*Suppl. to the Luxemburger Weinzeitung, Grevenmacher*, no. 15, 1st April 1913, 22 pp.

After reviewing the damage to vineyards in France and the Pfalz caused by *Clysia* (*Conchylis*) *ambiguella* the author estimates the loss from this pest alone to vine-growers in Luxem-

burg during the years 1904 to 1912 to amount to at least 8,750,000 francs, the total loss from all causes (frost, *Botrytis*, *Peronospora*, etc.) being four times that amount. The damage threatens to be increased by the rapid infestation by *Polychrosis botrana*, which seems to favour sunny, sheltered situations, while *Clysia* is not so particular in its selection of a locality.

The value of the natural control of these pests by birds, especially by tits, swallows and starlings, has been recognised by the authorities in Luxemburg. About 2,000 nesting boxes have been placed in suitable spots near and in vineyards, and State grants are also given to encourage the planting of trees and shrubberies in wine-growing districts for the same purpose. Numerous leaflets and circulars have been distributed and lectures held to educate the rural population as to the necessity for protecting bird life.

The breeding of Ichneumonids for the purpose of destroying the vine moths has not led to the results hoped for, so that more attention has been paid to control by parasitic fungi.

The pupae of the vine moth do not seem to be affected by extreme cold, but the eggs are very sensitive to sunlight and heat, so that proper methods of cultivation ought to ensure that individual vines obtain all available sunshine. Early picking of grapes is worse than useless. Certain strains of vine are more immune against the attack of the vine moth than others, but the degree of immunity varies according to the locality in which they grow, and no known strain is universally immune.

Experiments regarding artificial control have been undertaken by the Grand-ducal Viticultural Committee. On account of its poisonous properties lead arsenate was not used, and other arsenicals did not have the desired effect after a three years' trial. Nicotine powder manufactured by an Alsatian firm likewise proved to be unsatisfactory. The 'nicotine titrée' prepared by the French Régie could not be obtained, as the French State factories were unable to manufacture a sufficient quantity even for home consumption. An equally good preparation, Everth's 10 per cent. U.S.A. tobacco extract and soft soap (3½ lb.), applied with Bordeaux mixture (22 gallons) proved to be extremely satisfactory in the Grevenmacher, Machtum, Ahn, Niederdouven, Wormeldingen, Ehnien and Schwelsingen districts. Provided that the vines have been carefully pruned and all superfluous shoots removed, approximately 44 gallons of this spraying mixture, at a cost of ten shillings, will suffice for an area of about 1,200 square yards. Agricultural co-operative associations and the Viticultural Committee are permitted to import the tobacco-extract duty-free, thereby effecting a saving of 6½*d.* per lb. Unfortunately the campaign against the vine moth by chemical methods is too expensive to be carried out except where skilled labour is available. It is not advisable to combine spraying against this pest, which chiefly attacks the inflorescence, with the spraying against *Peronospora*, which damages the leaves. One of the chief disadvantages of spraying is the fact that it destroys the beneficial insects at the same time. The only method which promises to be of universal



value is careful cultivation and scrupulous cleanliness in the vineyards. As a compulsory campaign has its obvious drawbacks, the Government of Luxemburg have decided to encourage voluntary co-operation in the matter, and already do so by educational methods, as well as by the free distribution of cans and sticky racquets for trapping the adult moth and clean and proper material (bast, rush, &c.) for tying up the vines. A grant of 25,000 francs has been allowed for the improvement of paths in vineyards, the lack of suitable paths being a great difficulty in clearing away litter, etc., and giving access to the vines for the purpose of collecting infested grapes. The gradual replacement of the separate stakes for each vine by a system of wire training is recommended. The sticky racquet method has been most successful in some districts where the school children were employed in gangs to clear the vineyards systematically of the moth. Committees are being formed to undertake experimental work to investigate the merits of different methods of control.

**An Aphis Season.**—*Gardeners' Chronicle*, London, 7th June 1913, p. 377.

Aphides have rarely been more destructive than they are this season. They swarm on gooseberries, black currants, plums and apples, and spraying has proved practically useless against the leaf-curling species. The only effective method of treating aphid attack on currants is to dip the infested shoots into vessels containing an insecticide.

TÖLG (Prof. F.). *Psylliodes attenuata*, Koch, der Hopfen oder Hanf-Erdflöhe. Pt. 1. [The Hop or Hemp Flea-beetle, *Psylliodes attenuata*, Koch.]—*Verh. der K.K. zoologisch-botanischen Ges. Wien.*, lxiii, no. 1, 30th April 1913, pp. 1-25, 15 figs.

Part i. of this paper deals with the morphology and biology of the larva and pupa of *Psylliodes attenuata*, which has severely injured the hop-gardens of Saaz (Bohemia), and comparative remarks are made regarding the American hop flea-beetle, *P. punctulata*, as described by Parker and Chittenden. The author's investigations prove that *P. attenuata* produces only one generation during the year. The seeming occurrence of two generations, one in spring, and the other in summer, is due to the fact that the summer generation hibernates. Leaving its winter quarters in spring, it skeletonises the young hop-leaves, oviposits in the beginning of May and gradually dies off. The beetles hatching from these eggs make their appearance in the beginning of August and cause far more serious damage to hops by destroying the inflorescence. One of the chief factors which determine the development of the hop flea-beetle is the character of the soil. A light sandy soil in a moderately humid district is extremely favourable, as it offers the pest a suitable hibernaculum, and the larvae have greater freedom of movement; while a heavy soil, especially with a northerly exposure, hinders the

development of the larvae and pupae. The hop flea-beetle has a number of natural enemies (ground-beetles and centipedes), but they are by no means sufficient for its control. Clean methods of cultivation and the mechanical destruction of the pupae in the soil by hoeing, etc., are the best means of controlling the pest. Experiments are needed regarding the destruction of larvae and pupae by disinfecting the soil.

MORSTATT (Dr. H.). **Beobachtungen über das Auftreten von Pflanzenkrankheiten im Jahre 1912.** [Observations on the occurrence of Plant Diseases in 1912.]—*Der Pflanze*r, Daressalam, ix, no. 5, May 1913, pp. 211-224.

Fungus diseases as well as insect pests of crops in German East Africa are discussed in this paper. Cotton, on the whole, was less subject to disease than in former years, and in the Rufiji district was practically uninjured, probably owing to a careful selection of the seed. *Apion xanthostylum*, Wagn., at Amani damaged cotton grown from Venezuelan seed by forming galls on the stems. Another species, *A. armipes*, previously recorded from Nyasaland, has been found in Western Usambara. Specimens of *Dysdercus fasciatus*, Sign., and *Calidea dregii*, Germ., were sent to the author from a cotton plantation in Usumbwa. *Dysdercus cardinalis*, *D. festivus*, *D. nigrofasciatus* and *D. superstitiosus* are also found on cotton throughout the protectorate. *Serinetha hexophthalma*, Thunb., occurred at Kibongoto and has been reported as infesting coffee. *Oxycaenus hyalinipennis* in Myombo visited Egyptian, Mitafi and Abassi cotton previously damaged by the boll-worm, but did not attack adjacent Upland cotton. The large bug found on cotton at Tabora and recorded as *Calidea rufopicta*, Walk., has been identified by Schouteden as *C. apicalis*, Schout. Of the five species of Homoptera found on cotton at Mombo the most frequent is *Chlorita facialis*, Jac. Two species of *Lecanium* and *Pulvinaria* infested Upland cotton in Usumbwa and *Hemichionaspis minor*, Mask., occurred in Amani. *Pseudococcus perniciosus*, Newst. and Will. (*P. filamentosus*, Ckll.) was fairly frequent at Mombo and in Zanzibar.

Regarding market garden pests, a sawfly of the genus *Athalia*, closely allied to the Indian mustard sawfly, devastated mustard and radish fields. Experimentally these were twice sprayed with a 2 per cent. solution of Floria-Quassia soap containing 0.1 per cent. sodium arsenite and 1 per cent. of sugar. The application met with complete success, though the arsenite slightly burned the leaves, but subsequent rains caused a luxuriant crop. Vegetables in the Usambara and Meru districts were severely injured and a field of rape in Amani was completely defoliated by the diamond-back moth, *Plutella maculipennis*, Curt. The beetle, *Mylabris difurca*, Gerst., damaged beans, cucumbers and cabbages in Usambara. The Coccinellid *Epilachna chrysomelina* perforated cucumber leaves in Nyussi and damaged *Sesamum orientale* in Lindi. *Gryllotalpa africana*, known locally as Katololo, and *Gryllus* sp. did great damage to rhubarb, papaws and other plants

in gardens in Usumbwa. These pests may be destroyed by poisonous baits, consisting of a paste of flour and honey to which 1 to 2 per mille of arsenic has been added.

In Usambara a further advance of the white coffee-borer has to be recorded, as well as of the Anthribid beetle, *Phloeobius catenatus*, but the latter insect seems only to attack diseased coffee plants. In Usambara the coffee bug did not appear in alarming numbers, while there was an increase of stinking grasshoppers, *Zonocerus elegans*.

*Ceratitis anonae*, Grah., hitherto recorded only from Ashanti and Southern Nigeria on soursop (*Anona muricata*) and guava, has been reared from cacao pods in Amani. Curiously enough the Mediterranean fruit fly, *C. capitata*, which has been damaging coffee in Uganda, has not yet appeared in German East Africa.

In the older rubber plantations at Amani the larvae of the Castilloa borer, *Inesida leprosa*, have repeatedly damaged the trees. Dying branches of *Manihot glaziovii* were infested by a species of Ambrosia beetle the larvae of which feed on a fungus growing on the walls of the burrows.

Numerous enemies of the cow-pea (Swaheli, *Kunde*), *Vigna sinensis*, were recorded at Amani during the year under review, the most frequent being *Apion varium* var. *vicinum*, Wagn. The cow-pea weevil *Pachymerus (Bruchus) chinensis*, L., has also been found on East African sorghum millet. *Bruchus ornatus*, Fähr., occurred at Amani on cow-peas as well as on the beans of *Dolichos lablab* introduced from India. *B. obtectus*, Say, has been imported into Amani with Californian beans and *Caryoborus luteomarginatus*, Chev., in seeds of the Carnauba palm (*Copernicia cerifera*) from Brazil. Other pests of the cow-pea were *Sitotroga cerealella*, Ol., and two other moths, and a Scolytid, the presence of which has not been satisfactorily explained.

The Coccinellid, *Epilachna similis*, which has for several years been damaging maize in Aruscha, seems to be also beneficial, in that it controls scale-insects, especially *Coccus (Lecanium) viridis* on coffee, *Mytilaspis* sp. on citrus and light green aphids on cotton.

A Bostrychid resembling the Indian species, *Dinoderus distinctus*, has been damaging bamboo poles, even after an application of carbolineum. *Apate indistincta*, Murray, which is destructive to bamboo in British East Africa, has done much damage to building timber in the German Protectorate. Mahogany (*Khaya senegalensis*) has been injured by a small caterpillar causing an exudation of gum and by a beetle causing damage similar to that done by *Tragocephala pretiosa*.

**Le Pyrèthre de Dalmatie, sa Culture en Provence.** [Dalmatian Pyrethrum; its cultivation in Provence.]—*Jl. Soc. Nationale D'Horticulture de France*, xiv, May 1913, pp. 270-272.

Dr. E. Heckel of Marseilles began to experiment with the cultivation of Pyrethrum for insecticides in the year 1900 in consequence of the high price of flowers, 3s. 5d. to 3s. 10d. a lb. The experiments were made in the botanical garden at Marseilles



and in the neighbourhood of the town, and have shown that the plant lives longer and flourishes better if left to itself almost without care. The powder obtained from such flowers has been shown to be equally rich in the active principle with that grown in the East, the content being 8 per cent.; but it was found that in the case of plants which were cultivated and manured with great care the figure fell to 6 and even 5 per cent. Four lb. of fresh flowers are required to produce one lb. of the dry product. Dr. Heckel is of opinion that at present prices the cultivation might be taken up with some prospect of commercial success, and he urges the farmers of the South of France, Algeria, Tunis, and Morocco to give attention to it.

FAES (H.). *L'Acariose court-noué des Vignobles suisses*. [A mite disease in Swiss vineyards.]—*La Vie Agricole et Rurale*, Paris, ii, no. 27, 7th June 1913, pp. 14-17, 1 fig.

The author says that there are few diseases of the vine which in late years have caused so much alarm to vineyard owners as the disease which is known in France under the name of Court-Noué. It would appear that there is more than one disease which goes by this name, or that at least the effect upon the vine is the result of more than one cause. In France and Italy, Ravaz and Pantanelli appear to have determined that the disease is physiological in character. In Switzerland and Austria on the other hand, especially in the vineyards close to Lake Constance, it would seem that the disease known by this name is produced by a parasite which was remarked for the first time by certain vineyard owners of Tartegnin, near Rôle, and on the borders of the Lake of Bienna in Switzerland in the year 1900. Since that time the disease has spread with great severity through the cantons of Geneva, Vaud, Valais, Neuchâtel, Berne, and Schaffhausen, and every year it has been reported as occurring with greater or less intensity according to the nature of the weather in spring-time. The disease presents the following characters. The young shoots develop badly and the internodes are shortened; hence the name Court-Noué which has been given to it by the Swiss vine-growers. The leaves remain small, folded and crumpled, and never open in a proper manner, and the whole plant presents an aspect of more or less completely arrested growth. Where the attack is serious the shoots turn black, dry up and disappear, and a number of so-called false buds develop on the plant. The attacked wood revives as soon as the warm weather comes in, the shoots tend to resume their proper diameter and the internodes grow to their usual length, but the leaves at the base of the shoot, which were folded and crumpled, never develop properly, so that the vine presents a number of long shoots bearing these small deformed leaves. As a plant continues to grow, the upper leaves which have not been attacked develop normally in such a way that in the month of July it is generally possible to distinguish by the mode of growth of a vine whether it has or has not been attacked in the spring. The grapes do not develop; they abort or become so small that

there is very serious diminution of the crop, and sometimes no crop at all. The cause of the disease is a minute Acarid, and if, at the time of trimming the diseased vines, the brown and green scales which envelop the buds, as well as the young leaves which compose them, are examined they will be found to be covered and bitten in many places by this Acarid, which was discovered by Müller-Thurgau and further observed by Lozeron, Chodat and the author. Professor A. Nalepa, of Vienna, has described this Acarid under the name of *Phyllocoptes vitis*, sp. n. In the vineyards attacked, *Phyllocoptes* is found in quantity on the very young buds, interfering with their growth in such a way that when examined under the microscope many of the cells are found to be brown and dead. The parasite emerges from the bud with the young leaves, covering both surfaces and preventing their development. They are found in great quantities in the spring-time and the author says that at the present moment (May) there are to be found specimens of all sizes and many eggs; in summer there is a fresh outbreak. Towards the end of September the parasites begin to leave the branches and withdraw to the stem. In 1905 this movement was observed to begin on the 20th September, and on the 4th October it was difficult to find isolated individuals on the leaves; by 21st October they had all disappeared, but hundreds were crowded together on the bark of the stem, having there taken up their quarters for the winter. They were especially numerous on the fragments of bark at the base of the branches. From the cracks as many as 60 or 70 could be taken at a time. On the 27th December they were still found in great numbers on the bark and again on 25th January, when apparently frost had had little or no effect upon them. The author discusses at some length the parts of the plant most affected by the parasite. Direct treatment against the pest has not yielded very good results, sulphuring at the end of July or the commencement of August is however of some use, but the best treatment is preventive, and this should be carried out immediately after pruning in February or March when the Acarids hibernating on the vine stock can be very easily destroyed. The buds are not so far developed but that they will bear without harm the use of concentrated solutions of alkaline polysulphides; a 30 per cent. solution, either sprayed or applied with a brush, gives good results, and this should be applied two or three weeks before the growth begins. It is most important that the tips of the twigs should be thoroughly wetted, as well as the buds and the whole of the part which has been cut.

PICARD (F.). *La Chenille Bourrue des Vignes et ses Maladies*. [The "Woolly Bear," *Arctia caja*, and its diseases.]—*La Vie Agricole et Rurale*, Paris, ii, no. 27, 7th June 1913, pp. 19-20.

This caterpillar is omnivorous, but has developed a serious predilection for the vine, especially in the south of France. In the Mediterranean region there are generally two broods and occasionally three, and the caterpillars

hibernate under the bark of the vine-stocks. They come out again in the spring in considerable numbers and it is at this time that they do the most harm, by eating the young buds. Pupation takes place in May, the adults emerge in June and a second generation of caterpillars appears in June and July, but these are not much to be feared, as the vine leaves are too numerous and too tough to suffer much from their attacks, and the other plants growing between the vine-stocks provide food more to their taste. In the north of France there is rarely more than one generation, and though the number of caterpillars may occasionally be large, they never swarm as in the south. Every 3 or 4 years there are formidable invasions in the Garde, l'Aude and in Hérault, but each time an epidemic arises which decimates the caterpillars and sometimes appears to destroy them entirely.

Climatic conditions appear to have little effect upon these periodic outbreaks. In 1910, which was a year of great invasion, Braconids of the genus *Apanteles* appeared in great numbers and practically destroyed all the larvae, and this extraordinary prevalence of parasites secured freedom from the pest in 1911 and 1912. A fresh invasion, more formidable than the previous one, declared itself in the beginning of the present year, 1913, and at this time *Apanteles* was conspicuous by its absence, but the *Arctia* were destroyed almost to the same extent by two parasitic maladies; one due to a fungus, *Empusa* (*Entomophthora*) *aulicae*, which did good work during the great invasion of Hérault in 1896; and the other a bacillus, which the author has named *Coccobacillus cajae*. The latter can be cultivated with the greatest ease, especially at 25° C., on various media such as gelatine and bouillon. A caterpillar infected either by pricking one of its feet with a poisoned needle or by the introduction of a drop of the culture medium into its mouth, dies in 2 or 3 days of septicaemia. Frequently the caterpillar dies as the result of a violent diarrhoea which is set up before the septicaemia declares itself.

The author has experimented with several insects and has found this bacillus to be fatal to *Porthesia chrysorrhoea*, cockchafers, crickets, cabbage flea-beetles and others. White rats are not affected, but a few drops of the culture or an extract of an infected caterpillar will kill a green frog. The author does not explain how this remedy is to be put to practical use, but he suggests that it should prove of great value, not only against *Arctia*, but also against many other caterpillars which from time to time appear in enormous numbers in the vineyards.

**La Lutte contre la Chenille du Raisin**\*(*Arctia caja*, L.).—[The struggle against the Grape Caterpillar, *Arctia caja*, L.].—*Bull. de L'Office du Gouvernement Général de l'Algérie*, Paris, xix, no. 11, 1st June 1913, pp. 176-177.

The caterpillars of this moth are reported as having been very abundant this year in the vineyards of the South of France, and much attention has been given to methods of attacking the pest. The report contains a detailed examination of a paper by G. Catoni from "Il Coltivatore" in which the author



summarises the results he has obtained by the use of tobacco juice in the past year. The mixture employed consisted of  $2\frac{1}{2}$  lb. of juice and  $6\frac{1}{2}$  oz. of soft potash soap dissolved in 20 gals. of water. The experiments were rigorously made on an equal number of vines in the same locality and were performed under identical conditions as to the age of the vine-stocks and the mode of cultivation. The figures show that with one spraying on the 8th May or one spraying on the 17th July an increase of 6.1 per cent. of the yield was obtained. Two sprayings in May and two in July gave an increase of 23.5 per cent., and three sprayings in May followed by three in July and August gave an increase of 30.6 per cent. The reduction in the number of caterpillars which survived the treatment is represented respectively by the figures, 3, 2.8 and 0.95, whilst in the control plants the figure was 4. There is no doubt as to the value of the repetition of spraying. A series of figures is given for each year from 1902 to 1912 inclusive, showing the number of days on which the perfect insects of the first brood were observed on the vines. Further figures are given which show that not only the quantity of the yield was improved by the treatment, but also the quality. It would appear that there are considerable variations in the strength of the tobacco juice supplied by the Italian authorities; and Catoni also says that it is necessary that the soap should be standardised, because he has found that it occasionally produces burning of the leaves at a strength which has been previously used without harm.

DESLANDES (R.) & CHALOT (C.). Culture du Citronnier à la Dominique. [Lime cultivation in Dominica.]—*L'Agriculture pratique des Pays Chauds*, Paris, xiii, no. 121, April 1913, pp. 306-327.

The authors say that in the early days of lime cultivation in Dominica, insect pests were either of small importance or their presence was not observed, but that since the cultivation has been greatly extended, pests show themselves in serious numbers. *Lepidosaphes beckii* (*Mytilaspis citricola*) is the pest which causes the largest amount of damage and in 1902 threatened the destruction of the plantations. The only sprays which appear useful are those of soft soap and petroleum. *Chionaspis citri* is almost equally dangerous and especially attacks the trunk and main branches of the tree. It can be got rid of with comparative ease by painting the parts attacked with emulsions of soft soap, resin or petroleum, or even with milk of lime. The scale which is most feared at present is *Lecanium viride*, because its attacks are almost always accompanied by a disease known as "fumagine." Two other scale-insects, the red scale of the West Indies, *Chrysomphalus aurantii* (*Aspidiotus articulatus*), and the brown scale, *C. aonidium* (*Lecanium hemisphaericum*), are found, but are not considered so dangerous as the others. The following fungi are active agents in the destruction of scale-insects:—*Sphaerostilbe coccophila*, *Myriangium duriaei* and *Cephalosporium lecanii*. The authors remark that scale-insects may exist in a plantation for

years and cause such small damage that their presence may not be noticed, but that in damp years they multiply with very great rapidity and the planter finds his trees suddenly invaded on all sides. The insects prick the leaves and cause them to exude a sweet juice on which "fumagine" at once begins to develop; the vital functions of the tree are gravely interfered with and they either die or yield practically no fruit. If it be found that the parasites cannot be kept in check by spraying, the only thing to be done is either to cut down the trees entirely or at least remove and burn all attacked branches. For this reason there is little doubt as to the advantage of plantations set out in regular lines and with considerable intervals between the trees. In the early days a great mistake was made in planting the trees too closely and in no order, which has greatly increased the risk of infection and the difficulties of combating it when it arrives. They give the following formulae for spray emulsions:—

(1) Soft soap  $\frac{1}{2}$  lb., crude petroleum 2 gals.; the soap is dissolved in a gallon of hot water and the petroleum slowly added whilst stirring, and the stirring is stopped when the mixture has some resemblance to cream; at the moment of use it is made up to 30 gallons with water. (2) Powdered resin 4 lb., washing soda 3 lb.; these are mixed with a sufficient quantity of boiling water, kept hot until combination has taken place, and made up to 4 gallons; at the moment of use the whole is made up to 24 gallons. The best time for spraying is that at which the trees are pruned. After this operation has been performed it is much more easy to spray the trees thoroughly than before, but in any case spraying should be commenced at once on the appearance of the scales, and the second spraying should be given 10 days after the first in order to destroy young insects which have escaped the first treatment. It is important to conduct these spraying operations in dry weather, so that the solution may adhere to the leaves of the tree. If the trunks or the larger branches of the trees are seriously attacked, they should be scraped, and one of the above emulsions subsequently laid on with a brush.

Another enemy is the lime borer, *Leptostylus praemorsus*, which sometimes causes serious damage to the trees, the larva boring its galleries into the interior of the trunk and the principal branches. In order to meet this pest, all dead branches must be cut away, as well as the bark, and burnt, and the holes should be plugged with some mixture for killing the larvae, and it is further advisable to give the trunk a protective coating of some tarry compound to prevent the insect from laying its eggs upon it. The attack of these borers is said to be most severe in moist heavy soils, while the trees in light soil do not suffer so much.

**Root Borers and other Grubs in West Indian Soils.**—*Agric. News, Barbados*, xii, no. 287, 26th April 1913, pp. 138-139.

In Barbados the larvae of *Phytalus smithi* are found in the soil of cane-fields, gardens and plant tubs. During one night 500 to 600 of the beetles were captured on roses and other garden

plants near Bridgetown, in May 1910. They are not considered to cause any serious damage, possibly because the grubs are largely parasitised by a Scoliid wasp, *Tiphia parallela*. Little would have been known of this insect and its parasites in Barbados, even at the present time, but for the fact that its grubs occur in the same fields as the root borer (*Diaprepes*). *P. smithi* is a root trimmer rather than a root borer. The larvae feed on small roots and are often to be found in greatest numbers in the middle of the banks rather than in the cane holes. *Lachnosterna patruelis* is known to occur in St. Kitts and Dominica, and has so far only been found in the soil of the cane-fields and other cultivated lands. Its larvae have probably long been confused with those of *Ligyris tumulosus*. The amount of injury done by this insect is not known. It appears to be parasitised by the same Scoliid wasp as *Phytalus smithi*, and also by another, *Elis atrata*, which is a parasite of an injurious weevil, *Praepodes vittatus*, in Jamaica.

**Root Borers and other Grubs in West Indian Soils.**—*Agric. News, Barbados*, xii, no. 288, 10th May 1913, pp. 154-155.

For several years past species of *Lachnosterna* have caused great damage to sugar-cane and to onions in Antigua, and in Feb. 1913 a serious attack on maize was reported. The May beetle or "Caculo" is reported as having done considerable damage to the sugar-cane roots in Porto Rico and two further species of the subfamily MELOLONTINAE have been collected from the cane-fields; also 3 Dynastids, and in one district a large rhinoceros beetle is said to do far more damage to the cane than the common May beetle. The larvae of *Lachnosterna* also attack the roots of young orange trees and of several grasses. *L. patens* occurs in St. Vincent. Only the adult form is known, which feeds on the leaves of cacao and other plants. *Ligyris tumulosus* (the common "hard-back") is mostly widely distributed species in the West Indies and probably the most generally known of all beetles in these islands. The larvae live in decaying vegetable matter, such as megass, dead leaves and pen manure. It is regarded as unlikely that they feed on roots, at least under ordinary circumstances. A related species, *Ligyris rugiceps*, is known as the sugar-cane beetle in the United States. It is in the adult condition that this insect is injurious, for the beetle eats out cavities in the underground stem of the cane. A related insect *Dycinatus barbatus* is reported to have similar habits in Antigua, Barbuda and St. Kitts. The principal natural enemy of the common hard-back in Barbados and other islands is the digger wasp, *Dielis dorsata*. The banana root grub of Dominica and St. Lucia, *Ligyris ebenus* (*Tomarus bituberculatus*), is probably normally a scavenger, but it has on several occasions been found to cause serious injury to newly planted banana suckers, destroying the young roots and tunnelling into the soft base of the sucker. Plantains, tannias, yams and the roots of young cacao plants are also attacked.



**Root Borers and other Grubs in West Indian Soils.**—*Agric. News, Barbados*, xii, no. 289, 24th May 1913, pp. 170-171.

The rhinoceros beetle of St. Croix and Jamaica, *Strategus titanus*, was first reported in 1912 by Dr. L. Smith, Superintendent of Agriculture, St. Croix (Danish West Indies), as a sugar-cane pest, but it appears to have been known in the island since 1871. The grubs eat the roots of sugar-canes, sweet potatoes and other plants. They tunnel at the base of the stools and eat their way up into the stalks of the cane. In the case of young plants the eyes and the young roots are eaten off and the grubs often tunnel into the interior of the cuttings used for planting, resulting in the germination of not more than 20 per cent. in certain fields. The grubs are most abundant in August, and many adult beetles are to be seen in September. The fields in which the attacks have been most severe were manured with farm-yard manure, largely made up from megass. Examination of megass heaps revealed the presence of the insect and also of the common hard-back, *Ligyrrus tumulosus*, in considerable numbers.

Dr. Smith has tried a poisoned bait made from 100 lb. of megass and 3 lb. Paris green; a handful to be placed in a hole made with a drill alongside each plant. The insect is recorded from Jamaica as being found in the dead wood of an orange tree, and it has also been reported from the Virgin Islands. The same beetle or a related species is said to have caused more injury to the canes than *Lachnosterna* in a limited area in Porto Rico. The Rhinoceros beetle of coconut palms in Trinidad, *Strategus aloeus*, occasionally attacks canes. The attack of the adult *Strategus* on coconuts seems to be like that of the adult *Ligyrrus ebenus* (*Tomarus bituberculatus*) on banana suckers, while its attacks in the larval stage on sugar-cane rather resemble those of the larvae of *S. titanus* in St. Croix. Five other species of hard-backs of the family DYNASTIDÆ are known in the Lesser Antilles; these are:—*Cyclocephala tridentata* in Dominica and St. Lucia, *C. dimidiata* from Grenada, feeding on the flowers and flower-buds of cotton, and *C. vincentiae* in St. Vincent, and 2 species of *Leucothyreus*, one occurring in St. Vincent and one in St. Lucia, the adults of which feed on the leaves of plants, especially cacao and cotton.

The natural enemies of the adults of these insects are birds, lizards and toads. The hard-backs hide in the soil during the day, coming out at night, when the toads capture large numbers. The check cannot however be of very material consequence.

The larvae are ordinarily protected from the attacks of these enemies, but if the land be well stirred and turned over, large numbers of the grubs are destroyed. The most efficient control is the natural parasite, chiefly the Scoliid wasp, *Tiphia parallela*. Some of the other burrowing wasps are also known to attack grubs in the soil.

**Root Borers and other Grubs in West Indian Soils.**—*Agric. News, Barbados*, xii, no. 290, 7th June 1913, pp. 186.

The information concerning these insects which has already been published is here summarised in tabular form, showing their distribution, the habits of the larva and the adult, and the names of parasites where known.

BRADLEY (J. C.). **The Siricidae of North America.**—*Jl. of Entomology and Zoology, Claremont, Cal.*, v, March 1913, pp. 1-30, 5 pls.

A revision of the North American sawflies of the family SIRICIDAE, which are divided into two subfamilies: SIRICINAE, containing the genera *Sirex*, *Urocerus* and *Xeris*; and TREMICINAE, embracing *Tremex* and *Teredon*.

NOEL (P.). **La Cochenille oblongue (*Lecanium cymbiforme*).** [The oblong Scale, *Lecanium cymbiforme*.]—*Bull. Lab. Rég. Entom. Agric., Rouen*, 1913, pt. 3, pp. 3-4.

The author gives a resumé of a paper by H. Kehrig in the Bull. Soc. d'Études et de Vulgarisation de la Zoologie Agricole. He says that the vineyards of the South of France are being more and more attacked by the scale-insect, *Lecanium cymbiforme*. Mating takes place at the end of April and the beginning of May, according to temperature. The scales formed by the body of the female, which are fixed to the shoot and sometimes to the stock itself, are often so abundant that they touch one another and frequently cover the wood almost entirely. When fully developed in June the scales are 5-8 mm. long by 3-5 mm. wide. In winter, after pruning, the woody parts of the vine-stock are thoroughly brushed with a stiff brush charged with some caustic mixture; the author says that the only efficacious remedy against this pest is the use of good stone lime made into a thick cream, something like mortar, and laid on vigorously with a brush. When the lime dries it peels off and brings the scales with it. The lime should be used as hot as possible and the strokes of the brush should be from below upwards so as to avoid damage to buds. Kehrig gives the following recipe. Take 40 kgs. (88 lbs.) of stone lime, sprinkle it lightly with water at intervals, using the smallest quantity possible, not more than 10 litres (17½ pints), so that it falls into powder. When this operation is completed and whilst the lime is still hot pour on to it 10-20 kgs. of heavy oil, stirring the mixture until the lime has thoroughly absorbed the oil and the resulting material is a grey powder somewhat resembling cement. This operation will take an hour. The resulting powder is then carefully mixed with 190 litres of water.



It should not be prepared more than 2 days beforehand, should be well stirred when in use, and should only be applied in dry weather. One advantage of lime is that it can be seen rapidly on inspection whether the work has been properly done or no.

NOEL (P.). *Les ennemis de l'échalote.* [The enemies of the Shalot.]—*Bull. Lab. Rég. Entom. Agric., Rouen*, 1913, pt. 3, pp. 4-5.

The author says that up to the present the only known insect enemy of the shalot is the larva of *Anthomyia platura*, Mg., which eats the bulbs and causes them to become soft in the spring.

NOEL (P.). *Les ennemis de la chicorée (Cichorium).* [The enemies of Chicory.]—*Bull. Lab. Rég. Entom. Agric., Rouen*, 1913, pt. 3, pp. 5-6.

The number of cultivated varieties of chicory is large. They are almost all indigenous to the New World, except endives, which come either from China or Japan. The author gives the following list of insect pests of the varieties of this plant.

COLEOPTERA: *Rhizotrogus aestivalis*, eats the roots. *Pentodon punctatus*, Villers, eats the main root in the South of France. *Laeon murinus*, L., eats the roots. *Agriotes segetis*, Bjerk., also eats the roots. *Mordella aculeata*, L.; the perfect insect damages the flowers in May. *Cassida sanguinolenta*, Mill.; the larva eats the leaves in June.

THYSANOPTERA: *Thrips physapus*, Hal., sucks the juice of the stalks and petioles.

ORTHOPTERA: *Gryllotalpa vulgaris*, L., eats the roots and up-roots young seedlings.

RHYNCHOTA: *Aphis pieridis*, L., causes the flowers and seeds to abort. *A. cichorii* sucks the leaves and fouls them for use as salad in June. *A. intibi*, Kock, sucks the juice of the stalks of the seed-plant. *A. radicum*, Kirby, by thrusting its beak into the roots to obtain the juice, causes the leaves to turn yellow. *Capsus saltator*, Hhn., sucks the juice of the stalks and petioles in June.

HYMENOPTERA: *Aulax* sp. causes excrescences on the roots as large as a fowl's egg.

LEPIDOPTERA: *Cucullia lucifuga*, Schiff.; the larva eats the leaves in August. *C. lactucae*, Schiff.; the larva eats the leaves in July and September. *Polia flavicincta*, Hb.; the larva eats the leaves in May and June. *Agrotis plecta*, L.; the larva eats the leaves in autumn. *Chloridea (Heliothis) dipsacea*, Hb.; the larva eats the leaves in May, June, August and September. *Hyphoraia testudinaria*, Fourc. (*Arctia curialis*, Esp.); the larva eats the leaves in April and May.



## NOTICES.

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The Review of Applied Entomology is intended to contain, month by month, abstracts of the latest information published concerning insects injurious to man or animals, as the carriers of disease; and to forests, fruit trees, crops or stored merchandise.

The Editor will be glad to receive prompt information of the appearance of new pests, or of known pests in districts which have hitherto been free from them, and will welcome any suggestion, the adoption of which would increase the usefulness of the Review.

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